PERIODICAL ROOM
GENERAL LIBRARY
UNIV. OF MICH.

October 28, 1935

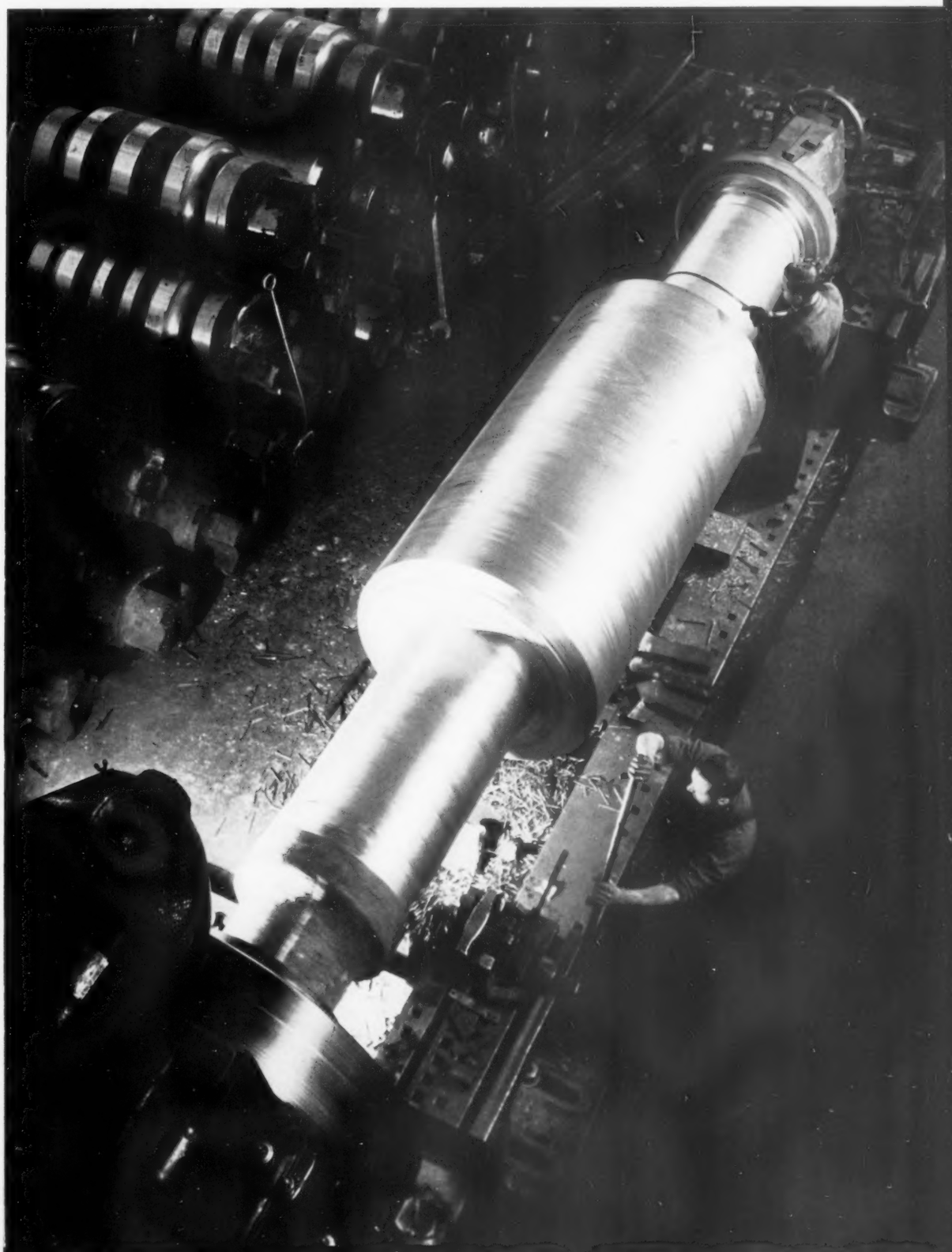
OCT 28 1935

STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

FOR FORTY-EIGHT YEARS—IRON TRADE REVIEW

MESTA
ROLLS
r PRODUCING
IGH QUALITY
ATES, SHEETS
and STRIP



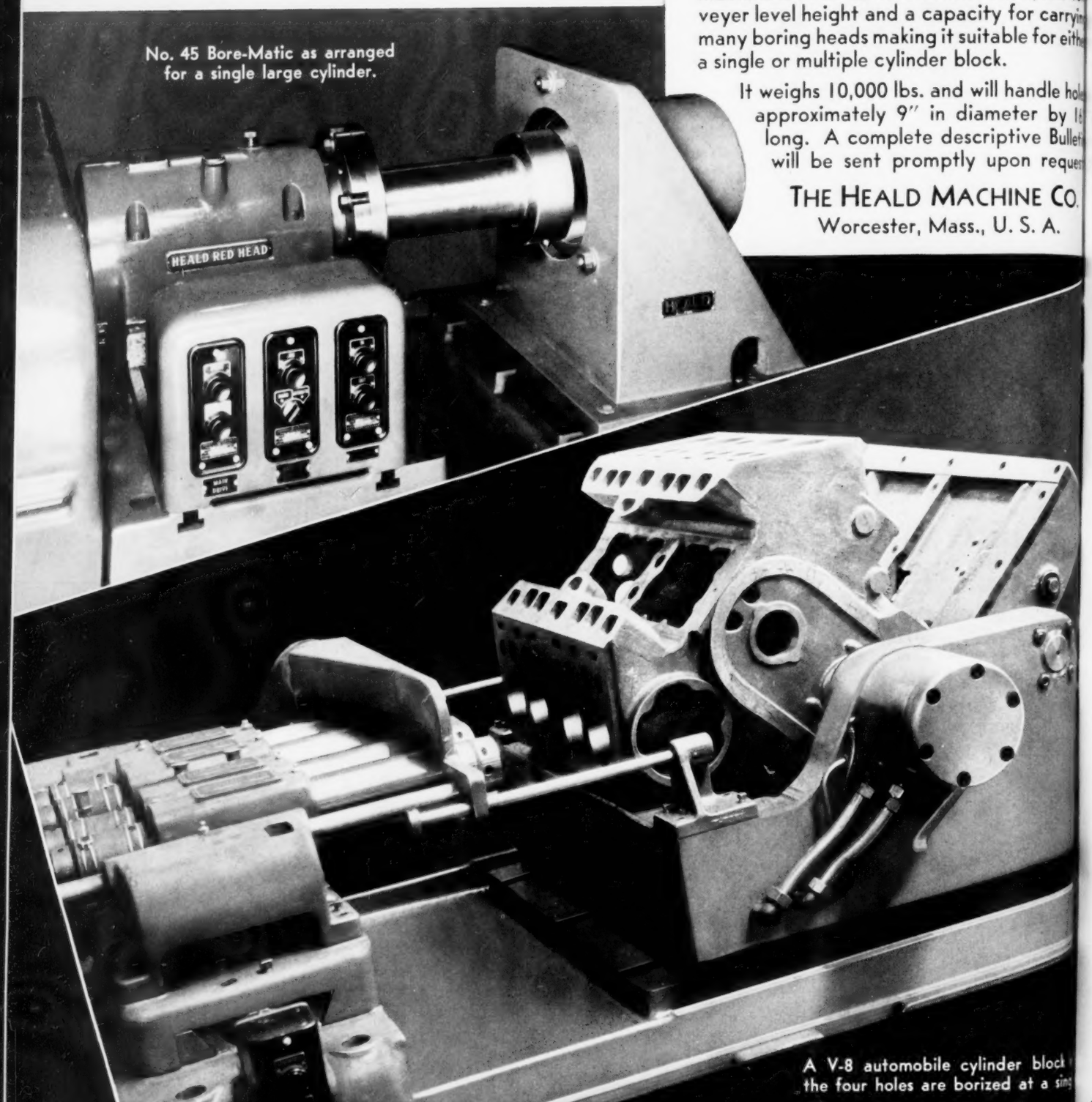
MESTA MACHINE COMPANY
PITTSBURGH PA

PRECISION FINISHING THE BORES OF *Single* OR *Multiple Cylinders*

THE Style No. 45 Bore-Matic was designe and built to give a final finishing operatio in bores of large, heavy irregular work. Th machine is of extra wide construction, has co veyer level height and a capacity for carryi many boring heads making it suitable for eith a single or multiple cylinder block.

It weighs 10,000 lbs. and will handle hol approximately 9″ in diameter by 1 long. A complete descriptive Bulleti will be sent promptly upon reques

THE HEALD MACHINE CO.
Worcester, Mass., U. S. A.



No. 45 Bore-Matic as arranged for a single large cylinder.

A V-8 automobile cylinder block w the four holes are borized at a sing

STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

For forty-eight years—IRON TRADE REVIEW

EDITORIAL STAFF

E. L. SHANER, *Editor*
E. C. BARRINGER, *Managing Editor*
E. C. KREUTZBERG, *Engineering Editor*

ASSOCIATE EDITORS

A. J. HAIN — E. F. ROSS
G. H. MANLOVE — J. D. KNOX
A. H. ALLEN

New York — B. K. PRICE—L. E. BROWNE
Pittsburgh . . . — E. A. FRANCE JR.
Chicago . . . . . — W. G. GUDE
Washington . . . . . — L. M. LAMM
London . . . . — VINCENT DELPORT

Published by
PENTON PUBLISHING CO.
PENTON BUILDING
CLEVELAND, O.

JOHN A. PENTON . *Chairman of Board*
C. J. STARK . *President and Treasurer*
J. D. PEASE . *Executive Vice President*
F. V. COLE . *Vice President and Secretary*
GEORGE O. HAYS . . *Vice President*
E. L. SHANER . . . . *Vice President*

BUSINESS STAFF

GEORGE O. HAYS, *Business Manager*
JOHN HENRY, *Advertising Manager*
R. T. MASON, *Circulation Manager*

New York . . — E. W. KREUTZBERG, J. F. AHRENS, J. W. ZUBER
Pittsburgh . . . . — S. H. JASPER
Chicago . . . . . — L. C. PELOTT
Cleveland . . . . — R. C. JAENKE

Contents . . October 28, 1935

Volume 97 • Number 18

AS THE EDITOR VIEWS THE NEWS 13
Third Quarter Reports Show Profit Area Regained 14
Scrap Trade Modernizing for Bigger, Changing Markets 15
Iron and Steel Institute Honors George M. Verity 16
Truscon Control Passes to Republic 16
All Europe More Prosperous, but War Threat Deters 17

- Production 18
- New Capacity 18
- Dismantling 18
- Meetings 22
- Labor 22

Opportunities for Steel, by E. L. Shaner 19
September Exports Down, Imports Increased 20
Mirrors of Motordom 21
Windows of Washington 23
Tension in Foreign Ore Market Eases 24
Industrial Men in the Day's News 25
Obituaries 26
War Embargo on Steel Still Debated 60
EDITORIAL—Business Better in Transportation 27
THE BUSINESS TREND 28
ENGINEERING DEVELOPMENTS:

- Shaving Gear Teeth 30
- Cleaning Cutting Oil 33
- L-c-l Shipping Containers 35
- Power Drives 36
- Methods and Materials 37
- Fuel from City Wastes 38
- Lamp Bulb Sockets 39
- Robert E. Kinkead 40
- Forum on Modernization 41
- Steel for Battery Clips 43
- National Safety Congress 44
- Progress in Steelmaking 45
- Open-Hearth Design—XXII 46
- Metal Congress Reports 52
- New Equipment 58

MARKET REPORTS AND PRICES 61-78
CONSTRUCTION AND ENTERPRISE 83
ADVERTISERS' INDEX 90

BRANCH OFFICES:

New York . . . . . **220 Broadway**
Chicago . . . . **Peoples Gas Building**
Pittsburgh . . . **1650 Koppers Building**
San Francisco . . . . **2413 Milvia St. Berkeley, Calif., Tel. Berkeley 7354W**
Washington . . . **National Press Building**
Cincinnati . . . **418-420 Sinton Hotel**
London . . . . . **Caxton House Westminster, S. W. 1**
Berlin . . **Berlin, N. W. 40, Roonstrasse 10**

Member Audit Bureau of Circulations; Associated Business Papers Inc., and National Publishers Association.

Published every Monday. Subscription in the United States, Cuba and Mexico, one year $4, two years $6; in Canada, one year $6.60, two years $11.20; in Great Britain and European countries, one year £2.

Entered as second class matter at postoffice at Cleveland under the Act of March 3, 1879.

Copyright 1935 by Penton Publishing Co.

NITRICASTIRON

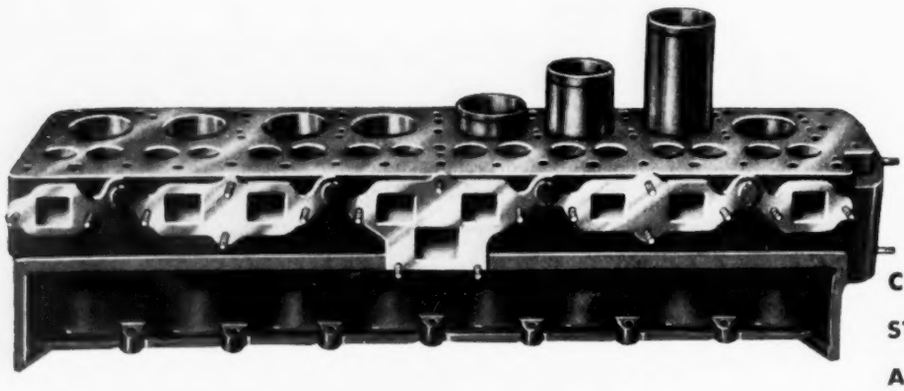
gives cylinder service a new meaning ★

ECONOMY of a new order has been inaugurated by Nitricastiron liners for engine cylinders subject to heavy duty operation.

In precisely the same service, Nitricastiron liners remain entirely free from all indications of wear when the conventional high strength chrome nickel cylinders have worn to a depth greater than 0.002 inches and show badly scratched interiors.

The Nitricastiron cylinder, as installed, has a hardened case from 0.008 inches to 0.012 inches thick which Brinells at from 800 to 1000. In spite of the extreme hardness, however, this case has a remarkably low co-efficient of friction due to the presence of nodular graphite and temper carbon uniformly distributed throughout its matrix.

Although available in Europe for several years, Nitricastiron centrifugally cast, has just been established in the United States by the Forging & Casting Corporation. Write for full information on the application of Nitricastiron to your specific condition.



FCC

COMPOSITE STEEL DIES • TOOL STEEL CAST TO SHAPE • TOOL AND ALLOY STEEL FORGINGS • NITRICASTIRON CAST CENTRIFUGALLY

THE FORGING AND CASTING CORPORATION

FERNDALE • MICHIGAN

Distributors

BRACE-MUELLER-HUNTLEY, INC.
Buffalo, N. Y. Rochester, N. Y.
Syracuse, N. Y.

EDGCOMB STEEL COMPANY
Philadelphia, Pa.

LUDLUM STEEL CO.
Chicago, Ill. Cleveland, Ohio
Los Angeles, Calif.
Pittsburgh, Pa. St. Louis, Mo.
Springfield, Mass. San Francisco, Calif.

EDGCOMB STEEL CORP.
Newark, N. J.

MOORE-HANDLEY HARDWARE CO.
Birmingham, Ala.

RUTLAND SUPPLY COMPANY
Rutland, Vt.

F. A. SEEGER
P. O. Box 1047, Atlanta, Ga.

As the Editor Views the News

RECOVERY is the *motif* of much of the industrial news of the week. Profits for third-quarter operations (p. 14) generally were well ahead of those for the corresponding period last year. Industrial activity since early in October has been staging the first sustained upturn (p. 28) since last April. In the field of transportation, an imminent shortage of freight cars probably will induce equipment buying by the railroads in the near future (p. 27, 61) and an accumulated deficiency in automobile demand promises to stimulate production in the coming year. Judged from any angle, the immediate outlook for the metalworking industries is distinctly encouraging.

• • •

Britain's Plan and Ours

Some months ago we predicted in this column that, at the psychological moment, the new deal would set aside its antagonism toward industry long enough to jump onto the bandwagon of industrial prosperity. The remark of President Roosevelt at Charlestown — "We are coming back soundly because we planned it that way and don't let anyone tell you differently."—sounds very much as if he has fulfilled our expectation. American industry *is* "coming back"—in spite of a plan involving *wasted* billions. On the other hand, Great Britain *has* "come back" to an even greater extent (p. 17), because of a simple plan of thrift and common sense.

• • •

Don't Impair Safety Work!

Promotion of safety is one of the finest achievements of American industry. The hazards of industrial employment have been reduced to an amazing degree since the turn of the century. But in spite of this excellent record, the safety movement still is confronted with many difficult problems. "Safety work cannot always be divorced from the complicated results of disability," declares the president (p. 44) of the National Safety council. "Compensation. . . . sometimes degenerates into a form of relief. . . . Compensation cannot be stretched to include sickness insurance, unemployment insurance and old age pensions without danger of the whole system breaking down. Other plans must be made for these social measures." This is a timely warning. It would be a pity if the excellent work now being done under private auspices were nullified or impaired by immature federal plans which attempt to do too much too quickly.

• • •

Welding Stands Quake Test

When earthquake strikes, every engineer thinks of his specialty and wonders how it stood the shock. True to form, welding specialist Robert E. Kinkead, regular contributor to STEEL, was impatient to know the fate of welded construction in the trouble zone. A telegram from STEEL to the Montana Power Co. elicited the highly satisfactory response (p. 40) that the company's gas lines—largely field welded by the electric arc and oxyacetylene gas processes, and some a combination of couplings and welding— had come through the ordeal unscathed. In the emergency, the facilities of this public utility functioned without interruption, supplying welcome fuel to quake sufferers in frigid weather. There are compensations for good engineering which go far beyond the limitations of commercial profit!

• • •

Saves Money by Cleaning Oil

While on the subject of welding, it is timely to remind readers of STEEL that the thirty-sixth annual convention of the International Acetylene association will be held in Cleveland, Nov. 12-15. Next week's issue (Nov. 4) will contain an insert devoted to this meeting, which will include full details of the program and appropriate supplementary information pertaining to the activities of the association and to recent progress in welding, cutting and other operations employing the oxyacetylene process. . . . Manufacturers who consider an increase of 8 per cent in the life of cutting tools and a substantial saving in cutting oil worth while, will be interested in the experience (p. 33) of an Ohio manufacturer of screw machine products who recently installed an oil cleaning system.

E. L. Shaner

Third Quarter Reports Show Profit Area Being Regained

FIRST reports from the iron and steel industry, embracing a cross-section of producers, consumers, and suppliers, indicate a landslide for profits over losses in the third quarter and also the first nine months of 1935.

Of the first 27 consuming, fabricating, and supply interests to issue statements, 23 improved their position in the third quarter over the corresponding period of last year, while 25 are ahead for the first three quarters.

Of the first eight corporations to report for the strictly producing branch of the industry, seven had a better third quarter than a year ago, and seven also are ahead for the year to date.

This improvement in the metalworking industries is outrunning business as a whole.

Net Income Doubles

The 27 consuming, fabricating and supply companies listed in the accompanying table earned a net aggregate income of $15,096,367 in the third quarter, which was an increase of 107 per cent over the like period of a year ago.

As compiled by the *Associated Press*, the earnings statements of the first 88 corporations of all kinds to report, possibly including some in the metalworking group, show a gain of only 18.7 per cent over a year ago.

The same 27 companies are 68 per cent ahead of last year on the basis of the first three quarters, whereas the *Associated Press* comparison for this period for the first 93 corporations to show their hand is an increase of 23.3 per cent.

In the producing area, the comparison is even more favorable to iron and steel. The first eight producers earned a net of $1,476,791 last quarter, balancing profits against losses, whereas a year ago they went into the red $4,560,484. The comparison for nine months of these same companies is a profit of $4,719,268 this year, a loss of $6,242,141 last year.

SHEET & TUBE ERASES DEFICIT

Youngstown Sheet & Tube Co., Youngstown, O., went into the black last quarter to the extent of $574,799, whereas a year ago it lost $1,257,371. Its experience this year has been steady improvement, the deficit of $595,769 in the first quarter being followed by a profit of $124,758 in the second quarter, and now a net of almost $600,000 in the third quarter. In nine months Sheet & Tube has made $103,787; a year ago it lost $1,668,633.

J. & L. GETS INTO BLACK

Jones & Laughlin Steel Corp. made a big contribution to this improved showing when it reported a profit of $233,914 for the third quarter, equal to 40 cents on the preferred, this being the first time since 1930 that two succeeding quarters have been profitable. Previous deficits this year make the 9-month showing for Jones & Laughlin a deficit of $516,463, but a year ago this loss was over five times as great, or $2,864,499.

REPUBLIC AT NEW HIGH

Republic Steel Corp. has just closed the most satisfactory earning period since its organization in April, 1930, when its operations for the first nine months of 1935 turned in a net of $3,264,295. In the corresponding nine months of 1934 Republic lost $2,193,158.

For the third quarter, Republic's

Consumers, Fabricators and Suppliers

All Figures Are Profits Except Where Asterisk Denotes a Deficit

	Third Quarter 1935	Third Quarter 1934	Nine Months 1935	Nine Months 1934
Minneapolis-Honeywell Regulator Co., Minneapolis	$786,656	$346,293	$1,057,826	$ 551,959
Edward G. Budd Mfg. Co., Philadelphia	31,344	*152,048	310,327	*87,282
Doehler Die Casting Co., Toledo, O.	.....	.....	499,345	403,505
Ex-Cell-O Aircraft & Tool Corp., Detroit	10,646	*53,575	217,927	146,659
Harbison-Walker Refractories Co., Pittsburgh	462,000	217,700	1,245,700	1,023,200
Marion Steam Shovel Co., Marion, O.	47,785	*83,708	*143,030	*345,992
Houdaille-Hershey Corp., Detroit	169,139	128,016	1,942,765	853,824
Motor Products Corp., Detroit	25,589	45,780	718,694	252,103
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.	2,557,552	*332,062	8,822,640	*363,787
Caterpillar Tractor Co., Peoria, Ill.	.....	.....	4,311,644	2,932,892
Union Carbide & Carbon Corp., New York	6,154,725	4,352,156	16,780,882	13,469,600
Noblitt-Sparks Industries Inc., Columbus, Ind.	.....	.....	357,853	236,973
Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich.	121,472	*49,659	392,792	22,615
American Machine & Metals Inc., New York	87,726	*12,291	168,296	14,480
Budd Wheel Co., Philadelphia	43,038	*32,480	559,598	116,129
Symington Co., Syracuse, N. Y.	*80,001	*67,069	.....	.....
M. A. Hanna Co., Cleveland	402,393	425,000	1,351,214	1,131,050
A. M. Castle & Co., Chicago	80,629	54,786	251,324	217,306
Yale & Towne Mfg. Co., New York	107,325	*70,521	169,163	*8,256
Allis-Chalmers Mfg. Co., Milwaukee	819,964	*84,923	.....	.....
Westinghouse Air Brake Co., Wilmerding, Pa.	63,191	198,372	*32,181	240,406
Otis Elevator Co., New York	.....	.....	479,752	*194,031
Air Reduction Co. Inc., New York	1,387,454	866,383	3,895,787	3,077,199
Evans Products Co., Detroit	37,584	*4,028	.....	.....
Clark Equipment Co., Buchanan, Mich.	.....	.....	*24,902	200,579
U. S. Hoffman Machinery Corp., New York	23,427	*43,175	135,778	79,452
Williamsport Wire Rope Co., Williamsport, Pa.	.....	.....	43,627	20,356
International Business Machines Corp., New York	1,756,729	1,652,338	5,304,844	5,053,514
Total	15,096,367	7,301,285	48,817,665	29,044,453

Producers of Iron and Steel

All Figures Are Profits Except Where Asterisk Denotes a Deficit

	Third Quarter 1935	Third Quarter 1934	Nine Months 1935	Nine Months 1934
Republic Steel Corp., Youngstown, O.	$507,371	*$2,598,600	$3,264,295	*$2,193,158
Jones & Laughlin Steel Corp., Pittsburgh	233,914	44,412	*516,463	*2,864,499
Youngstown Sheet & Tube Co., Youngstown, O.	574,799	*1,257,371	103,787	*1,668,633
Otis Steel Co., Cleveland	*27,367	445,402	1,360,448	563,308
Gulf States Steel Co., Birmingham, Ala.	58,433	*205,374	21,919	*13,571
Wickwire Spencer Steel Co., New York	4,655	*229,886	*160,269	*297,859
Acme Steel Co., Chicago	384,479	*13,846	1,319,817	867,532
Interlake Iron Corp., Chicago	*259,493	*345,221	*674,266	*635,261
Total	1,476,791	*4,560,484	4,719,268	*6,242,141

showing was a profit of $507,731, after all charges, including a loss of $177,000 on the sale of securities held in its investment account. This compares with a profit of $922,329 in the second quarter, and a loss of $2,998,600 in the third quarter of 1934. These statistics do not include Corrigan-McKinney and Truscon, just absorbed.

Republic ascribes particular significance to the increase in its operating profit. This, in the first three quarters of 1935, after maintenance and repairs but before interest on indebtedness, depreciation, depletion, etc., amounted to $12,067,674, or almost double the $6,294,853 in the first nine months of 1934.

LUDLUM IMPROVES POSITION

Ludlum Steel Co., Watervliet, N. Y., also made a big contribution to the improved showing when its third quarter earnings touched $118,199, against $7570 a year ago. For 9-months its position is a profit of $518,820, compared with $442,436 in 1934. These figures are before deduction of federal income taxes.

Ludlum, incidentally, is offering its stockholders the right to subscribe to one share of common for every four now held, at $21, and as many additional shares also at $21, as part of its financing for acquiring the Wallingford Steel Co.

WICKWIRE HEARING NOV. 4

Hearings on proposed reorganization of the Wickwire Spencer Steel Co. have been adjourned until Nov. 4 by Federal District Judge John Knight at Buffalo. (See STEEL, Oct. 21, p. 91.)

Scrap Trade Modernizing for Bigger, Changing Market; Revamp Institute

VAST changes in the methods of doing business during the past 25 years are being reflected in pressing need for adjustments in the iron and steel scrap industry.

Customers are fewer, competition is keener, supplies are less plentiful, the profit margin is smaller than was the case years ago.

The scrap industry no longer is composed of traders and order takers. It has reached major proportions and stands on equal footing with other basic industries.

Because of these developments, the need for changes in methods of doing business is becoming increasingly evident, and unless those in the industry can effect a measure of co-operation which will assure the growth and conduct of the business along modern-day principles there is little hope for success for those now engaged in the trade.

This was the consensus of opinion expressed by speakers at the mid-year conference of the Institute of Scrap Iron and Steel Inc., held in Cleveland, Oct. 23 and 24.

There is urgent need for co-operation in the scrap trade, I. G. Shapiro, Newman Iron & Steel Co., Cleveland, told the delegates at the Open Forum dinner Wednesday evening.

"Profitable purchases cannot be accomplished unless there is a spirit of co-operation among dealers," he said, "and unless you can bring yourselves to realize this fact you will have nothing for which to co-operate."

Speaking on a phase of the scrap business which he said he believed was going to come home to every one in the industry sooner or later, F. W. Frieder, Philip W. Frieder Co., Youngstown, O., pointed out that conditions surrounding prices have changed during the past 25 years.

Twenty-five years ago, he said, the only people with scrap to sell were scrap iron dealers, but today scrap is prepared by the producers of material so that the function of the dealer has been greatly restricted.

"The point that I am getting at is this," he said. "With that change an increase in the price of scrap, with the exception of the small tonnage held in the yards of various scrap dealers, does not benefit the scrap man because practically 90 per cent, or more, of the tonnage which he handles is already prepared when he gets it and he simply acts as a broker.

Not a Vital Commodity

"The commodity that we sell is a commodity on which we have no monopoly. It is a commodity without which the world could get along, if it had to, but it has a value as against a substitute commodity—pig iron."

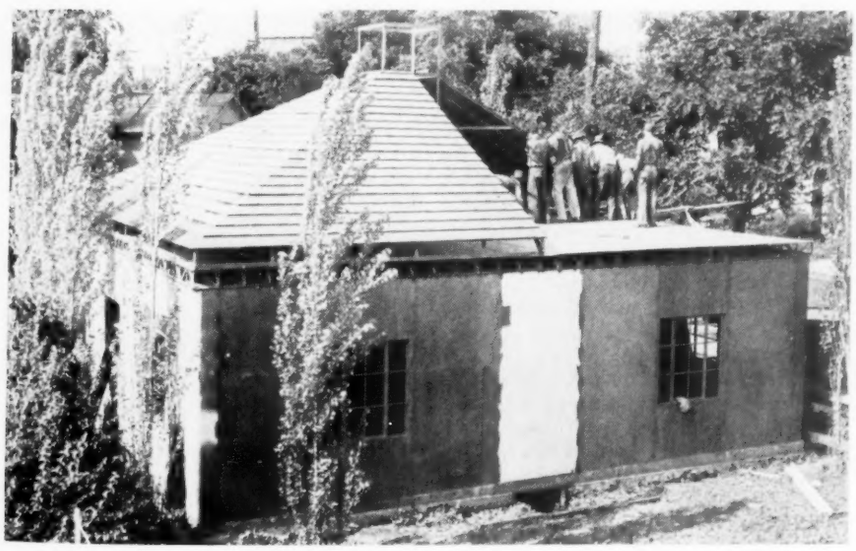
Mr. Frieder pointed out that if the cost of pig iron at steel plants is higher than the price at which scrap sells, it is to the advantage of the steel mill to buy scrap. However, he declared, if the price of scrap approaches too closely the cost of hot metal, then scrap becomes less desirable to the mills and less is sold.

"If our profits depend upon the volume of business, it would appear that any influence to jack up the price of scrap is an influence against the best interests of the entire scrap industry, both to producers and consumers," he said. "Unless the price of scrap is under the replacement value I am afraid that we may continue to lose business."

Benjamin Schwartz, director general of the Institute, directed the delegates' attention to the changes which are taking place, and summarizing conditions cited the reasons why methods of doing business in the scrap industry must be adjusted to present-day conditions.

He said that the tremendous ton-

A Good Looking Roof—and It's All Steel



Not a single piece of wood is used in the entire construction of this new and modern all-steel home, being erected by Hobart Bros., Troy, O. The above view shows the placing of roof sections, which were pre-fabricated, placed into position and arc welded into one solid steel roof. This home can be constructed at low cost by private contractors

nages of miscellaneous material formerly available to the dealer, and on which he obtained a fair profit through preparing it for the market, no longer are available to him.

Producers of scrap today are preparing their own material for the market, and scrap dealers simply act as brokers. He also declared that the type of scrap demanded by the trade has changed. No. 1 grades have been reduced in quantity to the advantage of lighter material.

The introduction of alloy steels on an increasingly larger scale presents the industry with a problem which must be mastered. New markets, Mr. Schwartz said, must be developed, and in the handling of this class of scrap the scrap dealer will find it necessary to have metallurgical knowledge on a par with that of the steelmaker.

Another factor contributing to the uncertainty in the scrap industry, he said, was the steady narrowing down of the market for material. From literally hundreds of small buyers in former years, outlets for scrap have shrunk to a comparative few through mergers, consolidations, etc.

In the past, the scrap dealer was a seller but in the future, Mr. Schwartz stated, he must be a buyer, for in buying will be found his margin of profit.

Water Shipments Perplex

The increasing movement of scrap by water also is presenting the industry with new problems, Mr. Schwartz declared. Shipments of scrap over the inland waterways are causing markets to cross one another and competition necessarily is becoming keener. Furthermore the steady increase in exports is serving to lessen domestic market supplies.

Discussing the export situation, Richard Bonomo, of the Schiavone-Bonomo Corp., New York, said:

"I have come back from my trip abroad with a healty respect for and appreciation of scrap. We in America do not understand its real value and give it very little consideration, while the fellows on the other side use it to the fullest extent and conserve it very jealously.

"Exports of our commodity are here to stay, and I say the demand we have had in the last three years is a mild one in comparison to what the future holds for us.

"At present the skies of the political situation in Europe are clouded, but these will soon clear and the wheels of international commerce will take on their usual routine. Then much of our scrap must find its way to where it is needed most."

Other speakers at the convention included Joel Claster, Luria Bros. & Co., Philadelphia, and president of the Institute, who presented a statement on the position of the Institute.

Ben Kaplan, of M. S. Kaplan Co., Chicago, pointed to accomplishments within the industry worked out under guidance of the Institute. He also called attention to the vast changes which have taken place in recent years and urged co-operation as a means of holding the gains attained.

H. D. Moskowitz, Schiavone-Bonomo Corp., New York, discussed the labor situation. He pointed to the recent efforts by labor in the steel industry to obtain higher wages and in his opinion higher steel wages should mean higher steel prices. Correspondingly, he thought scrap prices would be higher.

Directors of the Institute approved several suggested changes in the internal organization of the group. The board will be changed from its present membership of 27 to the presidents of the 14 chapters and six members at large.

Install Michigan Chapter

The post of chairman was eliminated. Only one vice president will be elected in the future, as against five at present. Setting up of a Michigan chapter also was approved with Maurice Schlafer, Schlafer Iron & Metal Co., Detroit, president.

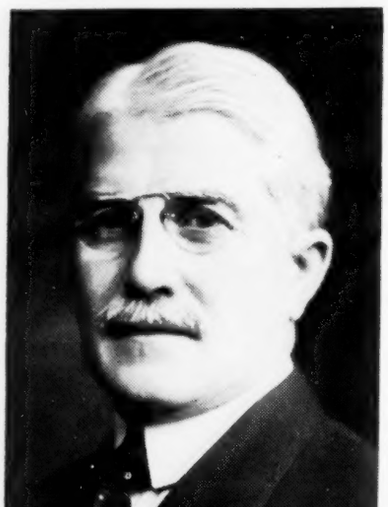
Approval also was given a motion to set up an insurance bureau to pool compensation risks of dealers under a co-operative plan. It also adopted a budget.

Chicago was selected for the next annual meeting to be held there the third week of January. About 150 members of the Institute attended the two-day meeting, and this was considered large for a mid-year convention.

Abe Cooper, the Wilkoff Co., Youngstown, won the president's cup at the golf tournament Wednesday afternoon held at the Beechmont Country club with a score of 84.

Institute Honors George M. Verity

GEORGE M. VERITY, chairman of the American Rolling Mill Co., Middletown, O., who recently resigned from the board of directors of the executive committee of the American Iron and Steel institute,



after having served the institute many years, has been elected honorary vice president.

This action was taken by the board of the Institute as an acknowledgment of the devotion of Mr. Verity to that body and the steel industry as a whole.

Born at East Liberty, O., April 22, 1865, Mr. Verity in 1886 became manager of a wholesale grocery in Cincinnati, but in 1889 he joined the Sagendorf Iron Roofing & Corrugating Co. as manager, embarking on a career in the iron and steel industry.

The Sagendorf company was reorganized in 1891 as the American Steel Roofing Co., of which Mr. Verity was made vice president and general manager. This company was absorbed by the American Rolling Mill Co. in 1899, and on Jan. 5, 1900, Mr. Verity was elected president and general manager. On Jan. 8, 1930, he became chairman of the board.

Truscon Control Passes to Republic

CONTROL of Truscon Steel Co., Youngstown, O., one of the country's largest fabricators of steel products for the building industry and a large factor in pressed steel, formally passed to the Republic Steel Corp. last Monday.

This followed the recent acquisition of the Corrigan, McKinney Steel Co., Cleveland, by Republic and rounds out the present Republic expansion program. About Jan. 1, Republic's headquarters in Cleveland and Youngstown will be consolidated in the Republic building, Cleveland.

Truscon, with a nation-wide engineering organization, branch sales offices and warehouses in 34 cities, and plants in Ohio, Michigan, California, Canada and Japan, assures Republic a large outlet for steel and indicates increased participation by Republic in the growing uses of steel for residential purposes, furniture, roads, office equipment, and household appliances.

All Europe More Prosperous But War Threat Is Deterrent

JUST when trade and industrial conditions begin to show signs of improvement in most European countries, heavy clouds are gathering in European skies, and the fear even of the possibility of a war extending beyond colonial territories is exerting its disturbing influence and retarding the normal flow of recovery.

The prevailing uncertainty for the immediate future tends to inhibit normal business transactions, while emergency defensive measures are diverting production into unwonted channels.

At the time of writing, a conflagration has started just outside Europe, but in which Europe is involved. It is impossible, at the present stage, to predict how far the blaze will spread and what the consequences may be.

If the trouble can be localized and smoothed over, one can express the hope that the scare will bring about a general return to sanity and bring nations together with the object of removing the numerous obstacles that have been set in the path of legitimate business during recent years.

If, on the other hand, European nations harden their attitude, the anticipation of a gradual return to prosperity will have been short-lived.

At all events, it is of interest to note to what extent production and trade have improved at this turning of the road. Undoubtedly Great Britain has made the biggest stride, and if unimpeded by extraneous factors, there is every reason to believe that conditions will gradually progress further.

France Only Laggard

So far as general activities can be measured by the employment of the iron and steel industries, distinct advance has been made in the industrial countries of central Europe, in Germany and in Scandinavia. Of the larger industrial countries, France still appears to lag behind, for reasons special to that nation.

The fact that steel production in Great Britain up to Aug. 31 reached 6,364,400 tons, against 5,892,500 tons in the corresponding period of last year, an increase of 471,900 tons in eight months, is not the only indication of improved conditions in that country.

In a speech by Neville Chamberlain, chancellor of the exchequer, at a banquet Oct. 1 and to which bankers and city merchants were invited by the lord mayor, the speaker was able to say that the revenue for the first six months of the year was "buoyant." He further stated that there was exceedingly little sign of check in the forward movement of trade conditions, that unemployment continued to decline and that figures of exports, retail trade, notes in circulation, bank clearings, bank advances, all showed substantial increases as compared with those of the same period a year ago.

Reports from industrial centers, such as Sheffield, Birmingham, Middlesbrough, Glasgow, Coventry, show that production is increasing, stocks are low, and order books are well filled. Two points are worthy of attention in respect to this picture of British recovery.

Firstly, it is almost entirely due to normal domestic requirements; no special impetus has been given in the form of large-scale public works under government control, and expenditure on national defense is being considered only at the present time.

The second point is that the recovery so far attained is almost entirely due to increased activities in the home market, exports generally for the first eight months of the year being only slightly higher than in the corresponding period of last year. In the case of iron and steel exports the increase is only 4.65 per cent. Imports, on the other hand, have decreased by 25 per cent.

In France, the improvement in conditions is hardly perceptible. Steel production statistics show a slight improvement over last year for the figures concerning July and August, with the result that for the first eight months of the year the output of 4,115,000 metric tons is just even with the output of the corresponding period of 1934. Iron and steel export figures are decidedly on the low side.

Underlying conditions, however, show at least a tendency toward improvement. M. Laval, the French premier, has firmly taken in hand the reins of government during the parliamentary vacation. The budget is balanced, the financial position has improved, and attempts to enforce a reduction in the cost of living have met with a measure of success. Uncertainty still remains, however, as to the attitude that will be taken by the chamber of deputies at the next session, and as to whether they will approve M. Laval's decrees and maintain him in power.

While home politics are still a determining factor in the uneasiness prevailing among the French people, a distinct sense of fear of being involved in another war, owing to the serious complications that have arisen in the European position, adds its paralyzing effect to the already existing lack of enterprise.

Exhibitions Help Trade

Belgium and Luxemburg continue to feel the effects of restrictions on imports laid down by other countries, especially Great Britain. In Belgium, however, a certain impetus has been given to business in general by the Universal and International exhibition that remained open from May 1 to Nov. 1. Up to the beginning of September, 20 million entries had been registered at this exhibition, a large proportion of which were foreign visitors. It is hoped that, as a result, a fillip will be given to Belgian trade in the coming months.

The Belgian government has also taken measures to help the country's basic industries. An arrangement is being planned with the national railroad corporation to enable orders to be placed for 500 steel cars; many schemes of public works are also being prepared, and several hundred million francs are to be spent or guaranteed by the state for these ventures.

Conditions in Germany are difficult to assess. In the iron and steel industry there has been considerable activity throughout the summer. Steel production to the end of August reached 10,236,280 metric tons, compared with 7,648,543 tons in the first eight months of 1934; since March, however, Saar production is included in German returns and accounts for about 975,000 tons. The increase in actual German production, as compared with last year, would be about 1,612,000 tons or 21 per cent for the period of eight

(*Please turn to Page 60*)

Europe Achieving Prosperity

MOST inopportunely arising as the long upward struggle of European nations from the slough of the depression shows signs of achieving a better basis, the present war situation brings uncertainty, in the view of Vincent Delport, European representative of STEEL, *in the accompanying quarterly review of the steel and iron industry in Great Britain and the Continent. While Great Britain leads in its achievement of a solid foundation; Continental nations all are approaching a better business basis. If the war clouds pass without involving the nations of Europe he believes the progress of recovery will be accelerated.*

Production

STEEL production advanced 1½ points last week to 52½ per cent, reflecting heavier schedules at Pittsburgh, Youngstown and Cleveland. Chicago, Wheeling and Buffalo went down last week, while the remaining districts held steady. Increased automotive releases and heavier rail rolling schedules helped to tone up the market situation last week. Further details follow:

Youngstown—Advanced sharply to 62 per cent, a gain of 4 points, and tentative schedules indicate a 64 per cent rate at this week's opening. Two blast furnaces—one Carnegie and one Republic—are being ilghted.

Detroit—Steady at 88 per cent, one producer operating all eight, while another continues with 7 out of 9 on.

Chicago—Declined 1 point to 54 per cent, lowest rate in 11 weeks and off 6 points from the peak of the past eight months. Relatively steady schedules are in immediate prospect. Seventeen of the district's 41 steelworks and merchant blast furnaces are active, with one additional unit expected to go in blast this week. The Zenith stack at Duluth is also scheduled to be lighted this week.

Wheeling—Off 3 points to 78 per cent last week, with 29 out of 37 open-hearth furnaces operating, against 30 open hearths on a week ago.

Pittsburgh—Up 1 point to 47 per cent last week. The leading interest has been showing a slightly higher operating rate, due to rail rolling schedules over the past week. The district's independents hold at a 50-55 per cent rate of operations.

Twenty-six out of 60 steelworks blast furnaces are on in the district. Carnegie-Illinois Steel Corp. has 11 of 32 on; Jones & Laughlin Steel Corp., 8 of 11; Bethlehem Steel Co., 3 of 7, and American Steel & Wire Co., National Tube Co., Pittsburgh Steel Co., and Pittsburgh Crucible Steel Co., 1 each.

Cleveland-Lorain—Up 2 points to 64 per cent. Corrigan-McKinney division of Republic Steel Corp. lighted two more open hearths since a week ago, to make nine, while National Tube Co., Lorain, dropped one to operate nine. Otis Steel Co. continued with seven. National Tube is lighting a third blast furnace at Lorain.

Central eastern seaboard—Unchanged at 38 per cent, with little variation noted in schedules at any point. Finished steel demand, however, continues to expand slightly, with indications pointing to a further increase in ingot operations in the near future.

New England—While unchanged at 68 per cent last week, a substantial increase is expected this week, two producers at least planning heavier schedules. Coupled with brisk and heavy finishing operations, is a low supply of semifinished steel at some mills.

Birmingham—Held at 58½ per cent, with 13 open hearths continuing to produce ingots. Although the surplus stock of ingots is not very great, it is sufficient to meet requirements for an indefinite time. Another period of rail rolling will begin this week, the ingots to be provided from Fairfield steelworks.

Buffalo—Off 10 points from the recent peak, due to a general slowing up of orders from consumers, other than the automotive trade. The latter is purchasing heavily and may cause an upward revision in schedules toward the end of this week. The necessity of changing over some production units also accounts in part for the drop. Fifteen open hearths are now making steel.

Steelmaking Operations

Percentage of Open-Hearth Ingot Capacity Engaged in Leading Districts

	Week ended Oct. 26	Change	Same week 1934	Same week 1933
Pittsburgh	47	+ 1	21	29
Chicago	54	− 1	27½	36
Eastern Pa.	38	None	20	20½
Youngstown	62	+ 4	26	38
Wheeling	78	− 3	29	36
Cleveland	64	+ 2	38	36
Buffalo	40	−10	24	24
Birmingham	58½	None	10	30
New England	68	None	40	80
Detroit	88	None	59	55
Average	52½	+ 1½	25½	30

ACTIVITY IN SHEETS SAGS MODERATELY IN SEPTEMBER

Sales, production, and shipments of steel sheets declined in September, according to the National Association of Flat Rolled Steel Manufacturers, Pittsburgh. Daily average sales dropped from 6905 net tons in August to 6547 tons in September; production, from 6720 tons to 6357 tons; and shipments, from 6030 to 5897 tons. September totals: Sales, 196,423 tons; production, 190,701 tons; shipments, 176,897 tons. Total sheet capacity in the country for the month was approximately 500,000 tons, and the capacity on which the association's figures are based was 302,500 tons.

CANADIAN STEEL OUTPUT UP IN SEPTEMBER; IRON STEADY

Canadian production in September totaled: 54,360 tons of pig iron, approximately the same as the August output of 54,414 tons, and against 43,019 tons in September, 1934; 4513 tons of ferroalloys, compared with 3893 tons in August, and 1147 tons in the same period a year ago; 90,952 tons of steel ingots and direct steel castings, an increase from the 82,488 tons in August, and comparing with 57,489 tons a year ago.

For nine months, pig iron output amounted to 419,064 tons, as compared with 279,090 tons for the corresponding period of last year; 37,867 tons of ferroalloys, almost double the 18,224 tons in nine months of 1934; 647,704 tons of steel ingots and castings, compared with 585,162 tons in the same period of 1934.

New Capacity

YOUNGSTOWN SHEET & TUBE CO. directors last week authorized expenditure of $1,000,000 additional to round out the facilities of the new strip mill plant in Youngstown, O. The expenditure will be made for cold rolling, annealing, and pickling machinery.

BUYING FOR HOMESTEAD MILL

Carnegie-Illinois Steel Corp. expects to start erection Jan. 15 of the building to house the 100-inch semi-continuous sheared plate mill to be erected at its Homestead, Pa., works. American Bridge Co. is fabricating and erecting the building.

Bids are being taken now on cranes, control equipment, shears, gages, reheating furnaces, and other equipment. Twelve overhead cranes from 10 to 100-ton capacity will be purchased. Total cost of the project is $15,000,000.

BUILD ACID OPEN HEARTH

Frank D. Chase Inc., Chicago, is associated with James Galvin, brother of John Galvin, president, Ohio Steel Foundry Co., Lima, O., in the design and construction of a 15-ton acid open-hearth furnace in the Allied Steel Castings Co. plant in Harvey, Ill.

Dismantling

CHERRY VALLEY furnace at Leetonia, O., idle for a number of years and last run by the Davison Coke & Iron Co., Pittsburgh, was sold at sheriff's sale at Lisbon, O., last week to the Kulka Iron & Metal Co., of Alliance, O., which will dismantle it. The furnace was first built in 1868. Its annual capacity was 140,000 tons of pig iron. For many years the Hanna interests of Cleveland operated the furnace. It brought $14,700, for taxes.

Thomas Spacing Machine Co., Pittsburgh, has received a contract for 12 needle valves for the Boulder dam, at $214,000, Pittsburgh. Each of these valves weighs 57 tons.

Opportunities for Steel

An Address Presented at the Thirteenth Annual Convention of the American Institute of Steel Construction Inc., White Sulphur Springs, W. Va., Oct. 16, 1935

BY E. L. SHANER
Editor of STEEL

IMAGINE that by waving a magic wand, it would be possible to banish all the gold from this world. What would happen? Unquestionably some other standard of value would be established for the world's monetary system and other metals would be called upon to replace gold in jewelry and in the other articles in which gold is used commercially.

In the same way, consider what would happen if all of the coal were banished, or if suddenly the world were deprived of wood, petroleum, silk, wool, cotton or other basic materials. We know that man immediately would turn to substitutes already available or which could be readily developed.

But try to imagine the blow to civilization that would be caused by the banishment of steel. Where could man turn to find a material or a combination of materials which would provide the infinite variety of desirable qualities which are inherent in steel? What substitute would serve equally well as the frame of a hundred-story skyscraper and as the delicate spring of a lady's wrist watch? What other substance could be made hard enough to function as the dipper teeth of a steam shovel or the rolls of a rock crusher and yet in slightly different analysis, can be made so soft that it can be whittled like butter by the tools of an automatic screw machine?

Basic to Civilization

One could go on indefinitely in this vein. The obvious conclusion is that steel comes closer to being indispensable that any commercial, non-edible material now available to man. Next to the air we breathe, the water we drink and the food we eat, it probably is our most useful substance. It is truly basic in every sense of the word.

Inasmuch as steel is so essential, one would think that persons responsible for making, treating, shaping and applying it to man's requirements would be enthusiastic over developing it into larger fields of usefulness in the future. In the main, individuals identified with steel *are* confident of its long-term future, but under the spell of five years of adversity, some of them have acquired certain misgivings as to the definite, nearby opportunities for steel.

It is easy to understand why such uncertainty exists in some quarters. The population of the United States is advancing more slowly than in the past. Immigration, which was an important factor for several decades, has been cut to an almost negligible figure. The initial stage of the task of extending the frontier of the country to its western limit was completed sometime ago.

E. L. Shaner

For these and other reasons some of the traditional markets for steel seem to have passed their peaks. It is doubtful whether we again will roll as many steel rails as we did in 1906 and 1907. In point of annual tonnage, the amount of steel going into cars and locomotives may never equal that of the period when steel was supplanting wood for freight and passenger cars. The interurban railroad business has ceased to furnish an important outlet for steel. In shipbuilding, barring a major war, many years may elapse before steel consumption mounts to records of the past.

Thus, if we think of opportunities for steel in terms of the traditional, so called "tonnage" markets, we can find much to dampen our enthusiasm. Also, if we fall into the error of believing that the country is fully developed physically, we will be prone to be unnecessarily pessimistic. And again, if we fail to sense the significance of changes that have been taking place during the past few years under our very eyes, we will, indeed, gravely underestimate the opportunities ahead for steel.

To envision the future development of this nation intelligently, it is important to consider the implications arising from the present tastes and mode of living of the people. The average standard of living of the 125,000,000 inhabitants is the highest attained anywhere in the world, at any time, if by "standard of living" we mean the possession of material conveniences and comforts.

The average family has or wants a good home, equipped with central heating, plumbing, numerous electrical devices including telephone and radio, electric lights, etc.; an automobile and a garage; an abundance of good food, clothing, etc.; education for the children, and the service of libraries, art museums, etc.; medical and dental attention and the use of hospital facilities; wholesome recreation, including the entertainment afforded by stadiums, theaters, auditoriums, city and national parks, etc.; and many other articles and services.

Think what is involved in maintaining the present standards and in extending them gradually to a still greater proportion of the population!

New Era in Transportation

America today is far from prepared to meet this challenge. To mention but one phase of the problem, the country has barely scratched the surface in the gigantic task of adjusting its transportation services to the new situation developed by the automobile, the motor truck and the airplane. Air transportation is forging ahead by leaps and bounds and as yet little is known as to what will be required eventually in manufacturing, operating and service facilities.

The passenger automobile now has been developed to an amazingly efficient machine and the problems of its manufacture, distribution, operation, maintenance and servicing have attained a stage of apparent stability. But the country has not yet adjusted itself to the influence of the automobile. While broad, smooth highways thread their way through the country-side, the streets in every large city are poorly adapted to the present demand of motor traffic. Extensive street widening, involving in many cases complete replanning and rebuilding in the older sections of metropolitan areas, will be necessary.

The railroads are beginning to

meet automobile and truck competition with methods which give promise of beneficial results. The reduced fares and higher speeds of certain western trains have increased patronage spectacularly. The advent of streamlining, the experiments with diesel power, extension of electrification, use of light weight high strength steel for freight and passenger cars and radical changes in ideas of design indicate clearly that a new day in railroad transportation is dawning.

The revolution going on in railway equipment means much to steel. If some of the changes inaugurated in a limited way during the past few years are taken up seriously by the important roads, a market of unusually attractive proportions will ensue. In the main, this market will call for a larger ratio of special steels than in the past. Weight saving will be an important factor. Gages probably will be lighter and in some cases light flat rolled steel may be substituted for heavier steel products. The railroads will continue to be one of steel's best customers, but in the future they will buy more of their needs from the first class stocks on

(*Please turn to Page 79*)

UNITED STATES IMPORTS OF IRON AND STEEL PRODUCTS

Gross Tons

Article	Sept., 1935	Aug., 1935	Jan. thru Sept., 1935
Pig iron	14,357	8,568	61,930
Sponge iron	149	151	966
Ferromanganese and spiegeleisen (1)	4,256	2,382	35,128
Ferrochrome (2)	.....	.....	1
Ferrosilicon (3)	54	50	660
Other ferroalloys (4)	.....	.....	1
Scrap	11,226	2,376	27,242
Steel ingots, blooms, etc.	340	194	1,601
Concrete bars	494	481	2,504
Hollow bar, drill steel	177	110	860
Merchant steel bars	39	98	8,439
Iron slabs	.....	.....	.....
Iron bars	14	228	1,160
Wire rods	1,495	801	10,407
Boiler and other plate	97	141	484
Sheets, skelp, saw plate	2,189	670	7,522
Tin plate	18	32	156
Structural shapes	2,766	4,521	27,850
Sheet piling	.....	.....	.....
Rails and fastenings	154	468	3,075
Cast iron pipe, fittings	.....	.....	27
Malleable iron pipe fittings, advanced	.....	.....	46
Welded pipe	1,409	293	3,179
Other pipe	1,881	610	12,384
Cotton ties (5)	2,347	1,000	7,301
Other hoops and bands	2,525	1,079	15,968
Barbed wire	1,931	1,656	18,299
Round iron and steel wire	308	251	2,967
Telegraph and telephone wire	.....	1	21
Flat wire, strip steel	161	249	1,278
Wire rope and strand	190	156	1,404
Other wire	132	127	883
Bars, solid or hollow (6)	1,944	2,329	9,130
Nails, tacks, staples	2,237	2,112	14,682
Bolts, nuts, rivets	6	1	233
Horse and mule shoes	46	64	491
Castings and forgings	145	128	906
	53,158	31,312	299,255

(1) Manganese content.
(2) Chrome content.
(3) Silicon content.
(4) Alloy content.
(5) New class. No comparable figures for 1934 or previous years.
(6) New classification as result of the reciprocal trade agreement with Belgium. No comparable figures for previous month or year.

Steel Imports Up; Exports in Decline

STEEL and iron exports from the United States in September, 244,419 gross tons, were the lowest since April, 2893 gross tons less than in August and 18.7 per cent less than in September, 1934, according to the metals and minerals division of the bureau of foreign and domestic commerce, Washington.

Exports of scrap, which had declined considerably the two preceding months, made a gain of 13,801 gross tons, but this was insufficient to balance large declines in shipments of iron and steel skelp and heavy steel rails. Other items of export showed no changes of consequence. Total shipments of scrap in September were 170,486 gross tons, compared with 156,685 gross tons in August.

For nine months of 1935 total exports are 2,384,467 gross tons, which is about 18 per cent larger than for the corresponding period of 1934.

FOREIGN TRADE OF UNITED STATES IN IRON AND STEEL

Gross Tons

	1935 Imports	1935 Exports	1934 Imports	1934 Exports
Jan.	22,784	262,740	22,653	178,023
Feb.	28,905	228,537	25,407	151,184
Mar.	21,409	323,035	38,393	261,269
April	28,866	205,336	26,862	201,539
May	47,719	286,598	29,465	241,753
June	33,208	289,687	24,848	219,406
July	31,894	296,802	17,676	233,186
Aug.	31,312	247,312	32,418	242,947
Sept.	53,158	244,419	23,847	301,330
9 mo.	299,255	2,384,467	241,562	2,030,291
Oct.	.....	.....	20,202	220,209
Nov.	.....	.....	35,272	299,263
Dec.	.....	.....	19,708	282,655
Total	.....	.....	316,761	2,832,764

ORIGIN OF SEPTEMBER IMPORTS

Gross Tons

	Pig iron	Manganese ore	Ferromanganese
Germany	2,538	8	445
Netherlands	5,782	....	....
Norway	337	....	1,395
United Kingdom	16	....	315
Canada	457	....	1,608
British India	5,227	8,859	....
Soviet Russia in Europe	.....	2,893	....
Brazil	.....	1,095	....
Chile	.....	283	....
Gold Coast	.....	3,280	....
France	.....	.....	375
Italy	.....	.....	118
Total	14,357	16,418	4,256

	Sheets, skelp and sawplate	Structural steel	Steel bars	Hoops and bands
United Kingdom	6	....	12	....
Belgium	1,112	2,494	....	1,619
Germany	1,068	81	7	382
Sweden	3	....	177	4
France	....	141	....	472
Norway	....	....	9	....
Austria	....	....	9	....
Czechoslovakia	....	....	2	....
Poland	....	....	....	47
Canada	....	....	....	1
Total	2,189	2,716	216	2,525

Imports of steel and iron products in September, at 53,158 gross tons, were 70 per cent larger than in August, 113 per cent larger than in September, 1934, and the highest total for any month in two years. For nine months imports total 299,244 gross tons, an increase of 23.6 per cent over the corresponding period of 1934.

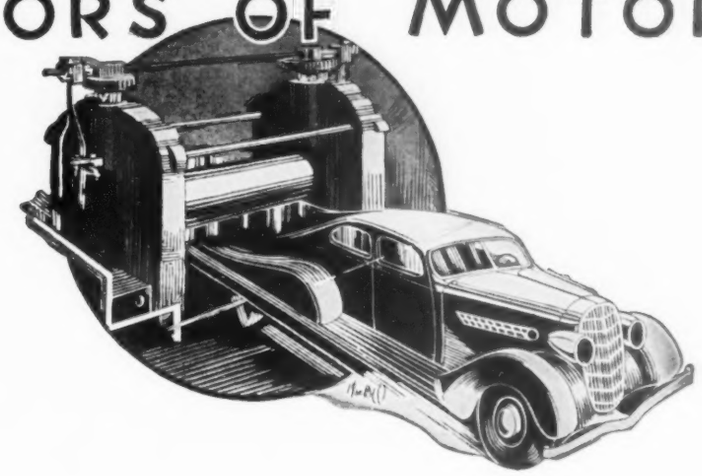
Of the 170,486 gross tons of scrap exported in September Japan took 56,188 tons, Italy 40,432 tons, the United Kingdom 30,531 tons, Rumania 12,291 tons, and Canada 7830.

UNITED STATES EXPORTS OF IRON AND STEEL PRODUCTS

Gross Tons

Articles	Sept., 1935	Aug., 1935	Jan. thru Sept., 1935
Pig iron	451	370	2,564
Ferromanganese and spiegeleisen	1	2	42
Iron and steel scrap	170,486	156,685	1,651,618
Tin plate scrap	2,483	2,779	30,651
Waste-waste tin plate	883	1,417	16,142
Ingots, blooms, etc.	1,540	3,657	35,195
Bars, iron	79	52	789
Bars, steel	3,382	3,545	38,837
Bars, alloy steel	357	191	1,869
Wire rods	2,200	2,692	18,878
Boiler plate	107	185	1,125
Other plate, not fab.	3,945	3,503	28,447
Skelp, iron or steel	2,894	12,117	32,277
Iron sheets, galv.	219	110	1,395
Steel sheets, galv.	5,039	5,060	55,206
Steel sheets, black	7,858	7,840	76,574
Iron sheets, black	469	403	4,066
Strip steel, cold-rolled	1,321	1,649	13,362
Strip steel, hot-rolled	2,045	2,207	18,819
Tin plate, taggers' tin	11,337	12,430	87,515
Terne plate	162	148	1,713
Tanks, except lined, etc.	375	611	4,694
Shapes, not fab.	4,194	2,767	24,839
Shapes, fabricated	1,186	860	13,152
Plates, fabricated	184	18	1,138
Metal lath	75	123	610
Frames, sashes, and sheet piling	869	123	3,736
Rails, 50 lbs. and over	3,238	7,800	35,137
Rails, under 50 lbs.	26	195	2,904
Rail fastenings	352	434	4,014
Switches, frogs, and crossings	178	177	1,084
Railroad spikes	209	156	1,884
Railroad bolts, nuts	79	36	393
Boiler tubes, seamless	839	595	6,253
Boiler tubes, welded	53	72	561
Casing and oil-line pipe, seamless	693	1,809	15,918
Casing and oil-line pipe, welded	285	60	3,955
Seamless black pipe, other than casing	279	101	2,168
Malleable iron screwed pipe fittings	247	491	2,577
Cast iron screwed pipe fittings	178	174	1,379
Cast iron pressure pipe, and fittings for	1,854	849	7,597
Cast iron soil pipe, and fittings for	827	169	3,334
Welded black steel pipe	1,268	1,032	12,863
Welded black wrought iron pipe	119	161	1,669
Welded galv. steel pipe	1,287	1,122	18,537
Welded galv. wrought iron pipe	167	70	827
Riveted iron or steel pipe and fittings	43	48	358
Plain iron or steel wire	1,069	1,517	11,574
Galvanized wire	1,479	2,383	16,106
Barbed wire	1,629	2,623	22,500
Woven wire fencing	155	178	1,568
Woven wire screen cloth	73	96	783
Wire rope	307	260	3,104
Other wire and mfrs.	296	399	3,774
Wire nails	830	962	7,940
Horseshoe nails	64	31	455
Tacks	40	32	303
Other nails, staples	190	236	2,031
Ordinary bolts, mach. screws, rivets, washers	575	469	4,848
Iron castings	431	499	6,665
Steel castings	298	209	2,135
Car wheels and axles	449	285	12,571
Horseshoes	8	21	150
Iron and steel forgings, n. e. s.	632	317	4,259
	244,419	247,312	2,384,467

MIRRORS OF MOTORDOM



DETROIT

WITH General Motors, Chrysler, Hudson, and Packard—to mention a few stocks—setting 1935 highs last week in Wall Street, it was not difficult for Detroit to see that the 1936 automobile situation was about to get off to a flying start.

By now the industry has pulled wide the curtains from its 1936 models. It is zero hour. The big push is on.

Over the two months left in 1935 there is avowed intent here to get away in high gear, come up to Jan. 1, 1936, with a sales increment, from which runway the '36 campaign will be launched in a big way.

Not that the lush spring market of next year is thereby to be mortgaged but that the country can really sop up more new cars, is the reason that Detroit is talking up 800,000 models for the final quarter of 1935—all in preparation for the calendar 1936 drive.

In September the estimate would have been a top of 650,000, but Detroit says today that to make more than three quarters of a million over the three months it ordinarily would have been retooling is no idle boast. This would compare with 380,000 for the closing quarter last year and a 1930-34 average of 325,000. It would be the highest since the fourth quarter of 1928—928,000.

Something New in Booms

Timely, therefore, was the publication last week of the prognostication, "The Coming Motor Boom", from the pen of the crystal gazer — Major Angas. In essence, it forecast potential car demand of some 9,000,000 in the next two years, 14,000,000 in the next three.

That would make the 1929 record of 5,358,420 look like a feeble boomlet. Though Detroit is not falling head over heels for every last word of the major's, even the most conservative can see nothing but improvement with a capital "I" next year.

So, it takes a pretty keen memory to think that only three and a half years ago this city had one foot in the grave, banks were closed, script was circulated, and the industry speculated whether the country was going back to the horse and buggy.

Theoretically, Nov. 2, which is the date of opening of the New York show, is the actual 1936 season turning point. But through last week automobile assemblies advanced again. The week accounted for 62,015 new cars; a week ago it was 44,416 and two weeks ago, 31,643 units.

Ford, in shooting for 4800 a day, looks to be a near-future strong point. Last week, Ford made 15,075 models, against 5010 the preceding week, and was rapidly gaining toward that objective.

Eliminating Bottlenecks

One bottleneck at Ford has been radiator shell assemblies. Another is forming some of the stainless steel body trim parts. A heavier gage steel has been specified in many cases, and holding to surface has been a serious problem, so much so that new sources of supply have been called in.

Ford has stocked most of dealers with at least one of the 1936 models. Filling the field with display and demonstrator cars alone will account for a large wedge in near-future production.

Chevrolet, anxious to get 60,000 jobs in the field by Nov. 2, crossed 10,000 assemblies last week compared with 7000 the week before and 1500 two weeks ago. Sixty thousand cars out would give an average of six cars per dealer.

According to the $25,000,000 expansion program of Chevrolet in late 1935 and early 1936, the company will have ten assembly plants and a far-flung enterprise of parts' manufacture. No better evidence of attempting to escape labor trouble or production bottlenecks has been seen in the automobile industry in the last few years.

Within a few days production of new Chryslers and DeSotos will be started. Without assistance from these two divisions, the Chrysler production total late week was 16,700 units, approximately 9000 for Plymouth and 7600 for Dodge. Unfilled orders amounting to 40,000 are claimed for Plymouth, with the line thus far shown only privately by dealers.

DeSoto has attracted no little publicity (to which this also is a contribution) by spiking the "rumor" that the 1936 DeSoto is a woman's car. The "rumor," of course, is a teaser for prospective women buyers, and while Byron C. Foy, president of DeSoto, stoutly declares that his new model, which really is attractive, is "a car for everyone," no woman should sign on the dotted line unless she really means it.

Hudson has been having difficulty getting dies in readiness for its coupe and convertible models. In the meantime, 400 jobs a day, 5 days, accounted for 2000 assemblies last week.

Buick, which has been easing off after completing the stocking of dealers, is holding at about 3500 units a week. Olds is leading all General Motors divisions, except Chevrolet, with a weekly total of about 3750, while Pontiac is at about 3500.

Olds Design Popular

Detroit is saying that Buick has "out Oldsed" Olds, and it is interesting to note in passing that the die-cast radiator grille and the general front end appearance which Olds introduced last year and Buick has so closely followed this year was considered for Chevrolet in 1934. But the General Motors high command turned thumbs down on the design then.

Other weekly production statistics are Packard 1550, Reo 200, Willys 300, Nash-LaFayette 1000, Auburn 225, and Cadillac-LaSalle 800.

Hupp last week began the assembly of its new series. Graham-Paige, still closed, is expected to start any day. Lincoln this week is expected to step up the production of its new medium-price model, which it can be definitely stated will be introduced at the New York show.

It may be that the "safe driving campaigns" which are now sweeping the country may put the issue

squarely up to automobile manufacturers.

Some makers, like Hudson and Plymouth, have gone in for more safety features this year, such as safety torque arms and stronger frames. On the other hand, the craze for speed continues unabated, even Buick this year advertising "100 miles per hour."

There is some speculation that even though an automobile with a top speed of 10 miles per hour would not be foolproof in the hands of an incompetent driver, nevertheless there is an opportunity for redesign and the incorporation of more in-built safety features.

Redesigning for Safety

Statistics prove that most automobile deaths—to occupants—are caused by the crushing force of the steering wheel and the decapitating effect of the windshield.

This suggests a revolutionary change in steering and an increase in the space between the driver and the windshield.

Thus far, bumpers appear to be chiefly an embellishment, but there is some sentiment for a redesign that would absorb shocks up to a speed of 50 miles an hour.

In brakes, the trend has been rather swiftly toward improved mechanisms. By the time all 1936 models are announced, it will be seen that about half of the total production will be the hydraulic type.

Automobile Production

Passenger Cars and Trucks—U. S. Only
By Department of Commerce

	1933	1934	1935
Jan.	128,825	155,666	292,817
Feb.	105,447	230,256	335,700
Mar.	115,272	338,434	429,834
Apr.	176,432	352,975	477,746
May	214,411	330,455	364,727
June	249,727	306,477	361,321
July	229,357	264,933	337,044
Aug.	232,855	234,811	240,051
Sept.	191,800	170,007	89,805
9 mo.	1,634,126	2,384,014	2,929,045
Oct.	134,683	131,991	.....
Nov.	60,683	83,482	.....
Dec.	80,565	153,624	.....
Year	1,920,057	2,753,111	.....

*Estimated.

Estimated by *Cram's Reports*

Week ended:

Oct. 5	24,770
Oct. 12	31,643
Oct. 19	44,416
Oct. 26	62,015

Labor

OFFICIALS of the American Sheet & Tin Plate Co., a subsidiary of the United States Steel Corp., have refused the request of a committee representing the company's employe representation plan, for a 15 per cent wage increase, vacations with pay, and some modification of by-laws of the plan.

This was the first procedure of its kind initiated under the employe plan, which came into vogue under the collective bargaining provision of the now-defunct national industrial recovery act. It is reported that the employe committee threatens to take its request to headquarters of the Steel corporation in New York.

A similar wage request by employes of the Jones & Laughlin Steel Corp., Pittsburgh, has not yet come to a decision.

Meetings

NATIONAL GALVANIZERS' association holds its annual meeting at the Hotel Cleveland, Cleveland, Oct. 29 and 30. This meeting is of such importance to the job galvanizing industry that all members of the industry and not only association members, have been invited to attend.

Jessop Is Licensed To Make Molybdenum Steel

Jessop Steel Co., Washington, Pa., has announced that under a license agreement with the Cleveland Twist Drill Co., Cleveland, holder of patent covering "Mo-Max" type of molybdenum high-speed steel, it is producing the same type of steel under the trade name of "Mogul." This steel entails the use of only a small quantity of tungsten and of relatively high amounts of molybdenum.

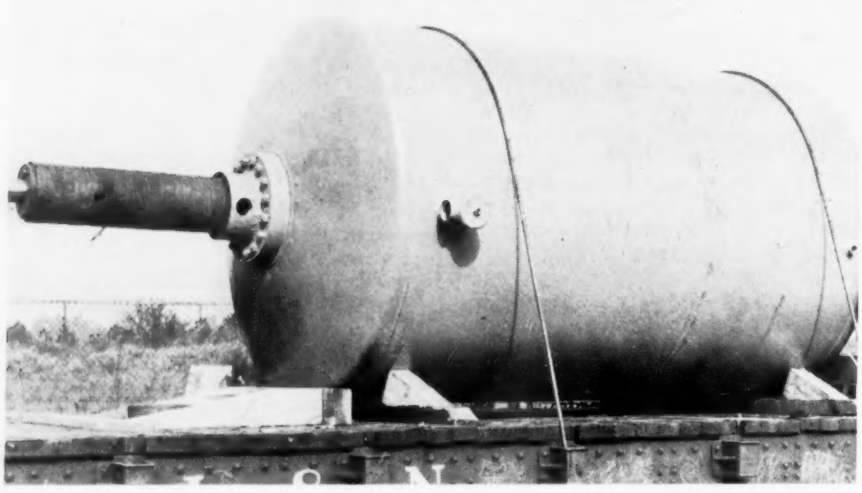
R. Edson Emery, president of the Jessop company, in making the announcement, pointed out that of vital importance to American industry is the location in the United States of the largest known deposits of molybdenite, from which ferromolybdenum is made.

In the event of war between other nations, the United States would not be dependent upon the import of this material, and production of molybdenum high-speed steel would not be interrupted for lack of raw materials. Moreover, the small amount of tungsten contained in this steel can be supplied by American mines.

U.S. Steel Hires Engineers

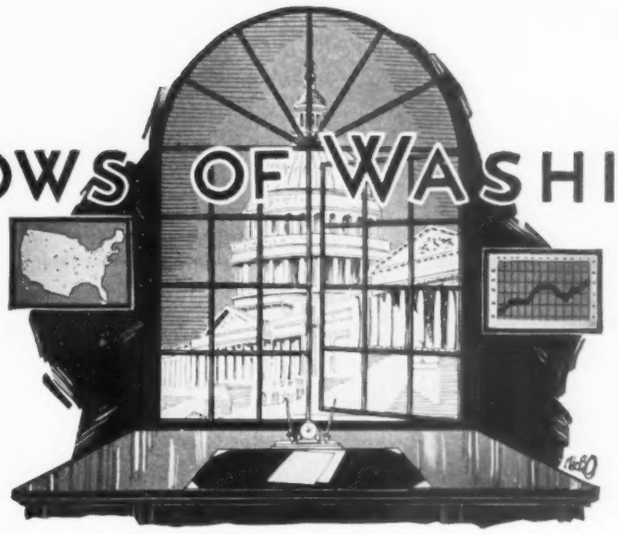
The United States Steel Corp. has engaged the engineering firm of Ford, Bacon & Davis, New York, effective Nov. 1, as part of its reorganization plan. Recently it engaged the advertising firm of Batten, Barton, Durstine & Osborn Inc. to represent it.

Giant Stainless Steel Plate Fabricated



THIS shows the process equipment being shipped by J. P. Devine Mfg. Co., Mt. Vernon, Ill., incorporating the use of what is claimed to be the largest single plate of stainless steel ever made. STEEL, Oct. 14, page 20, reported that this material was made by Allegheny Steel Co., Brackenridge, Pa., the plate weighing 7500 pounds, being 1-inch thick, 23 inches long, and 116 inches wide. The plate was fabricated into a 6-foot i.d. and 10-foot length Devine vacuum and pressure jacketed revolving carbonator type autoclave and extractor. The inner shell and heads are of KA2S, and all castings coming into contact with the charge or vapors are KA2SMO. The jacket is of welded carbon steel construction. Shipment as shown above was made from the Devine company's plant Oct. 11. STEEL, Sept. 30, page 9, illustrated a stainless steel sheet, 84 x 90 inches, displayed at the National Metal congress in Chicago by the American Rolling Mill Co., Middletown, O., reputed to be the largest stainless sheet

WINDOWS OF WASHINGTON



WASHINGTON

INDUSTRY'S attitude toward the proposed industry-labor conference of Maj. George L. Berry, co-ordinator for industrial co-operation is apparently becoming a question of considerable interest, judging from the advance industrial scouts who have come to Washington recently in an effort to find out what it is all about.

Incidentally all industry is not sending in enthusiastic replies offering co-operation, as Major Berry is trying to show. For instance, the automobile, lumber and several other of the larger industries are not at all enthusiastic about the meeting.

On the other hand, there are said to be some industries which would much rather attend the conference than have the NRA experts snooping around their offices to get information for their so-called "studies," and there is talk in some quarters that Major Berry is swapping or trying to swap these studies for attendance at the conference.

Plans Are Nebulous

At present, little is known about the existence of any well-prepared plan for future NRA legislation, or the exact procedure by which the conference or conferences will eventually lead to legislation.

There is only a definite assurance that permanent legislation in the form of "an industrial statute of broad import" is contemplated in order to preserve "permanently to the nation such social and economic advantages as were gained through previous emergency enactments."

There is the feeling among many industrialists that the promise of a "breathing spell" is exceedingly welcome to business as a whole. On the other hand, confidence in the fact of a breathing spell is weakened by continued attacks on business by various government agencies and by the call of the conference to discuss permanent legislation to control business.

The experience of NRA certainly leads to the conclusion that a partnership between the government and business through voluntary action as originally contemplated under the NIRA is a myth, and that federal domination by threat or by actual imposition resulted from the recent experiment.

It is the feeling of many that the studies now being conducted at NRA will provide a basis for analysis of problems which should receive consideration before an attempt is made to enact permanent legislation to meet these problems.

Would Await Court Action

It is believed further that the action of the United States Supreme Court during the coming six months on many vital legislative issues should be awaited before enactment of further legislation which may seem to be on the borderline of constitutionality.

The general feeling at NRA, particularly among those who are most familiar with the industrial situation, is that nothing should be done at least for a year in connection with any permanent legislation, and that the calling of the Berry conference at this time is unsettling and disturbing to industry.

Industry will certainly be put "on the spot" if labor and consumer representatives agree to a certain program, while industrial representatives appear to be recalcitrant. In that case, industry will be forced into a position of reluctant compromise, as it was in the case of the NRA extension.

Sullivan W. Jones, who at one time was connected with NRA on the industrial advisory board and who is a close personal friend of Major Berry, is now signing himself assistant co-ordinator. No one around NRA seems to know who appointed Mr. Jones to this position, but everyone is interested.

The Automobile Manufacturers' association, through Alfred Reeves, vice president, replied to the Berry letter as follows:

"With respect to the proposed round table conferences in Washington to thresh out the question of further NRA legislation, the policy of the motor industry would be strongly opposed to the idea of such meetings. . . . the variations in industry requirements do not permit of solution in mass meetings but rather require long and exhaustive study. The NRA itself is collating past information and trying to arrive at the fundamental issues which are involved. Recovery is proceeding and to inject controversial and unsettling discussions into the picture would surely do more harm than good. . . . I am sincerely hopeful, therefore, that no attempt will be made to hold the meetings on the subject during this period of study."

Major Berry has addressed a second communication to Walter S. Tower, secretary of the American Iron and Steel institute, in connection with the proposed industrial conference.

Four Hours for Procedure

It is understood that Mr. Tower sent an answer to Major Berry relative to his first letter in which he expressed a "friendly" interest in the proposed conference and asked for some further details.

Mr. Tower, it is reported, suggested in his answer to Major Berry that it would be hard to get co-operation at a joint conference of labor and industry. Major Berry's communication answers Mr. Tower as to procedure:

"I thing it is highly important that industry as a whole, representative of management and labor, meet in joint session for the specific purpose of outlining the procedure. This meeting, I am convinced, should not last more than four hours and perhaps less.

"In the meeting referred to above, the industrial groups, as for example the steel industry and its immediately related industries, will be asked to confer among themselves. A suit-

able place will be arranged for them to hold their meetings and such clerical staff as they may desire will be furnished them. In these meetings, management will be meeting with management and labor will be meeting with labor. The conferences will be separate and distinct.

"In the meetings outlined in the preceding paragraph it will be requested that they, the representatives, prepare such memoranda, resolutions, suggestions or legislative proposals as they may conclude to be best for the purposes outlined in my invitation.

"At the conference meeting of each industry described above, each group will be requested to select some person of their own choosing to whom will be referred the conclusions arrived at by the conference. This person will be appointed upon a subcommittee to meet the similar representatives of other industry groups with the purpose of endeavoring to compose a plan of procedure.

"In addition to all that has been said above, it will be my purpose, in the letter announcing the date of the meeting, to invite conference of specific industries, preceding the larger conference, in order to get their point of view and to be able to speak intelligently with reference to their attitudes."

In the meantime, several members of the industrial division of the present NRA who also feel that such a meeting would be "disturbing" to industry have conferred with Major Berry in an effort to have him put off the conference indefinitely. He evidently feels he cannot do this.

No Formal Word on Date

It has been variously stated at NRA that the meeting would be held the first part of November, then the middle of that month, and the latest is that it will not be called until the latter part of November or early in December.

However, no official pronouncement has yet been made, and it is assumed here that Major Berry is waiting for the return of the President to talk the situation over with him.

It is stated here, by those in a position to know, that the major had no program for the conference and that he has stated that he will give industry a chance to put through any program that it might have. It is pointed out by interested parties that Major Berry cannot expect the business men to come down here and work out some program of their own for the conference when they don't even seem able to find out what it is all about.

Considerable interest was evidenced last week when NRA announced the holding of its first hearing on proposed labor provisions for the voluntary code for the specialty paper box industry. This will be the initial hearing under the new setup by which the federal trade commission takes care of the trade practices and the NRA the labor provisions of the voluntary agreements.

Howell Cheney, former secretary of Cheney Bros., silk manufacturers of Manchester, Conn., who has been the "watch dog" for industry since last February as chairman of the industrial unit of the NRA advisory council is leaving this week—the last of the industrialists to go.

The next last one was Charles Edison, son of the late inventor, who gave up the ghost some months ago. Although his praises have been unsung, Mr. Cheney has done yeoman service at NRA for industry. Many a time he has stood between the powers that be and industry, and come off with flying colors.

W. P. Witherow, Pittsburgh steel man, and several members of the industrial advisory board of the old NRA were in Washington Friday conferring on a successor to Mr. Cheney, of the present NRA industrial unit advisory council, who will also sit in on behalf of industry at the labor provision hearings of the voluntary codes. While no confirmation can be obtained, it is reported that the position has been offered to Wilson Compton, of the National Lumber Manufacturers association.

METALWORKING GROUPS SOUND OUT FTC ON TRADE RULES

Comparatively little progress is being made at the federal trade commission in connection with either trade practice rules or so-called voluntary agreements. Such rules as are now before the commission are moving slowly.

It is reported, however, that several branches of the iron and steel industry have contacted the commission in the matter of procedure in relation to the possibilities of either trade practice conference rules or the voluntary agreements.

Among these are understood to be the Pacific coast steel fabricating, fabricated metals, cast iron pressure pipe, machinery and allied products, and metal lath, industries; also the automobile industry.

TARRIFF REQUESTS DISMISSED

The United States tariff commission announced last week that the following applications filed with it for investigations under section 336 of the tariff act of 1930, permitting adjustments, have been denied and dismissed without prejudice:

By American Iron and Steel institute, New York, for increase in duty on structural shapes not assembled and also when fabricated.

Also by the Institute, on steel bars, except concrete, plates, sheets, skelp, wire rods, hoops and strip.

By Cox Steel & Wire Co., Dallas, Tex., on woven wire fencing composed of wire smaller than 0.08-inch except poultry netting.

Tension in Foreign Ore Market Eases

NEW YORK

DESPITE continued discussion of embargoes on raw materials to Italy, a decidedly calmer atmosphere pervades the foreign ore market here, as tension eases between England and Italy.

In the apparent better relationship between these two countries a crisis of major proportions seems to have been averted, along with sweeping repercussions in export and import markets.

Further, the belief is growing in the trade here that embargoes on raw materials, such as pig iron, tin, ores of various descriptions, aluminum, copper and other metals will not be applied by the League of Nations.

There is still question as to what the final attitude of the United States will be in the matter of further embargoes, affecting raw material shipments to the warring countries. However, the best opinion now is that there will be no action, certainly not before the next session of congress.

The more conciliatory attitude of England and Italy toward each other has tended to check talk of soaring ocean transportation charges, at least for the time being, and to defer the possibility of any acute shortage of materials such as a major conflict might develop.

No Cessation to Buying

At the same time, the possibility that raw material sanctions will not be made effective carries the implication that war in Ethiopia will be continued and that there will be further substantial buying by Italy and probably by other European powers in preparation for whatever emergency may develop. All this augurs for continued strong prices on foreign ores.

This appears true, for instance, in manganese ore, which at present is under particular scrutiny because of the impending reciprocal treaty between the United States and Brazil, which would reduce the import duty on this material to this country.

It appears to be generally conceded that the c.i.f. price on manganese ore is going to be advanced, possibly to a level which in all probability will offset any advantage to the consumer in this country that might accrue from a reduction in the import duty.

There are reasons for this, it is said, in addition to the strong demand abroad. These include ocean freight rates, which have already been advanced and which may go even higher notwithstanding foreign

(*Please turn to Page 60*)

Industrial Men in the News

Frank J. Rief, Purchasing Agent for Chicago District of Carnegie-Illinois Steel Corp. and also Universal Atlas Cement Co.

He will act as purchasing agent for Atlas Cement, a Corporation subsidiary.

For 23 years he has been connected with the Corporation, advancing steadily to his present post.

A native of Wisconsin, he received his early training in its public schools and at University of Wisconsin.

FRANK J. RIEF, purchasing agent for the Chicago district of the newly-formed Carnegie-Illinois Steel Corp., has also been appointed general purchasing agent for the Universal Atlas Cement Co., another subsidiary of the United States Steel Corp., to take effect Nov. 1. He will succeed W. H. Dutcher, purchasing agent, who has been with the Cement company for over 30 years and who asked to be relieved of his duties. Mr. Dutcher has made application for a pension under the Steel corporation's plan.

Mr. Rief has been connected with the Corporation for 23 years, beginning his work at the South Chicago plant of the Illinois Steel Co. In 1916 he was transferred to the purchasing department of the company in its Chicago office. In 1918 he was appointed buyer; in 1924, assistant purchasing agent; and in 1930, purchasing agent. In addition to his work with the Carnegie-Illinois Steel Corp., he is also purchasing agent for other Corporation subsidiaries, including the Scully Steel Products Co., Gary Land Co., United States Fuel Co., and Lafayette Fluorspar Co.

The consolidation of the Universal Atlas company's purchasing department with that of other subsidiaries, is in line with the Corporation's new policy of unification of activities.

Mr. Rief is a member of the American Iron and Steel institute, Chicago association of commerce, Illinois Athletic club, and South Shore Country club. Farming, fishing, hunting and golf provide his relaxation outside of office hours. He is a native of Wisconsin, and was educated in its public schools and at the University of Wisconsin.

♦ ♦ ♦

A. E. McKinstry, who retired from the presidency of the International Harvester Co., Chicago, last May has been elected chairman of the board's executive committee. The latter formerly was known as the finance committee. Mr. McKinstry, since his retirement, has continued as a director and as a member of the committee to which he has been elected chairman.

♦ ♦ ♦

E. T. Weir, chairman, National Steel Corp., Pittsburgh, will be the principal speaker at the thirty-eighth annual dinner of the Illinois Manufacturers' association, Dec. 10, at the Stevens hotel, Chicago.

♦ ♦ ♦

Hunter Hicks has been made vice president of the Merchant's Steel &

Hunter Hicks

Supply Co., Chicago. Mr. Hicks has been associated with the company in the sale of iron and steel scrap for the past two years, following his graduation from Dartmouth college.

♦ ♦ ♦

F. C. Brandt, formerly in the Chicago office of the Babcock & Wilcox Co., has been placed in charge of the newly-opened sales office at 1809 Railway Exchange building, St. Louis, which will serve eastern Missouri and southern Illinois.

♦ ♦ ♦

T. E. Millsop, formerly vice president of Weirton Steel Co., Weirton W. Va., has been appointed executive vice president of the company, effective immediately. Mr. Millsop had been vice president for about a year, prior to which he was assistant to the continuing president, J. C. Williams.

♦ ♦ ♦

C. E. Kendall has been appointed manager of merchant product sales for Pittsburgh Steel Co., Pittsburgh. Mr. Kendall went with the company in the Chicago office in 1919. He was appointed assistant manager of that office in 1923, a post he held

E. H. Ballard

Who as noted in STEEL, Oct. 14 has been elected a director of the American Foundrymen's association. He is with the General Electric Co. at West Lynn, Mass.

until December, 1928, when he became assistant manager of the fence department in the general offices in Pittsburgh. Since May, 1930, Mr. Kendall has been manager of fence sales.

♦ ♦ ♦

M. C. Anglock, president of the Vesta Coal Co., subsidiary of Jones & Laughlin Steel Corp., Pittsburgh, has been elected to the board of the Pittsburgh chamber of commerce. He succeeds A. B. Shepherd, vice president of Jones & Laughlin Steel Corp., who has resigned from the chamber.

♦ ♦ ♦

Robert L. Baldwin has been elected sales development manager of the electrode division of the National Carbon Co. Inc., Niagara Falls, N. Y. He has been closely associated with the electrode and electric furnace industries for 25 years.

After spending several years with the United States Steel Corp., engaged in the introduction and exploitation of the Heroult electric furnace, Mr. Baldwin was for 15 years sales manager of the Republic Carbon Co., and recently sales manager of the Republic division of the National Carbon Co. Inc. He will continue to maintain his office at Niagara Falls, N. Y.

♦ ♦ ♦

Manley E. Lord, formerly secretary of the manufacturing committee of the General Electric Co., Schenectady, N. Y., since July 1, 1930, has been named co-ordinator of all refrigeration manufacturing units.

Mr. Lord will be succeeded as secretary of the manufacturing committee by Armand T. Chandonnet, who for the past several years has been doing special assignments under the supervision of W. R. Burrows, vice president in charge of manufacturing.

♦ ♦ ♦

Howard J. Kaighin has been appointed vice president and general manager of the Standard Tube Co., Detroit. He formerly was works manager of Steel & Tubes Inc., Cleveland.

♦ ♦ ♦

R. J. Mauer, purchasing agent for the Detroit Lubricator Co., Detroit, recently was named president of the Purchasing Agents Association of Detroit, of which he has been a member since December, 1917. Other appointments include Joseph McRobbie, American Blower Co., as first vice president; William G. Boley, Detroit City Gas Co., as second vice president, and F. D. Sicklesteel, Ex-Cell-O Aircraft & Tool Corp., as treasurer.

♦ ♦ ♦

Jerome Strauss, chief research engineer of Vanadium Corp. of America, New York, at its Bridgeville, Pa., plant, is now in charge of all research and development work, one of the posts vacated by Dr. B. D. Saklatwalla.

J. Ralph Davis, as previously noted in STEEL, is vice president in charge of operations, the other post vacated by Dr. Saklatwalla.

♦ ♦ ♦

Frank M. Bender, until recently vice president and general manager of the Lycoming Mfg. Co., Williamsport, Pa., has been elected vice president in charge of operations of White Motor Co., Cleveland. His duties will embrace the co-ordinating of purchasing, engineering and production facilities.

♦ ♦ ♦

J. D. Agnew, for the past 14 months in the roll sales division of the Aetna-Standard Engineering Co., Youngstown, O., has resigned effective Oct. 31. Formerly he was with the Continental Roll & Steel Foundry Co., East Chicago, Ind.

D. A. Currie

Who for the past 12 years has been vice president and general manager of the Erie Foundry Co., Erie, Pa., recently has been made president and general manager. He has been associated with this organization for 29 years, beginning his career as timekeeper in 1906

♦ ♦ ♦

Edmund Burke, recently in charge of the oil sales department, has been made manager of industrial sales of Crane Co., Chicago.

♦ ♦ ♦

George Satterthwaite, of the American Iron and Steel institute and head of its enforcement division in administration of the steel code, has resigned to become executive secretary of the Cold-Finished Steel Bar institute, effective Nov. 1, with headquarters at 74 Trinity place, New York. He was graduated in mechanical engineering from Swarthmore college, and spent many years at Midvale Steel & Ordnance Co., becoming general superintendent. He was an organizer of the Tacony Ordnance corps in 1917 and several years later became associated with Henry Disston & Sons Inc., Philadelphia, of which he shortly became vice president and general manager.

Died:

FREDERICK A. HALSEY, 79, engineer, author and inventor, in New York, Oct. 20. Graduate of Cornell university, from 1892 to 1894 he was general manager of the Rand Drill Co.—now Ingersoll-Rand—and invented the "Slugger" rock drill. In 1894 he became associated with *American Machinist*, serving as editor from 1907 to 1911, and editor emeritus since then. He was active in opposing introduction into American industry of the metric system, and was a commissioner of the American Institute of Weights and Measures. He was author of numerous engineering treatises, some of which are now standard textbooks.

♦ ♦ ♦

E. L. Mayer, 53, president of the Century Tool & Metal Co., Chicago, in that city, Oct. 22.

♦ ♦ ♦

Charles S. Swain Jr., 37, personnel manager of the Oxweld Acetylene Co., in Newark, N. J., Oct. 14.

♦ ♦ ♦

George W. Thurston, 81, vice president of the American Screw Co., Providence, R. I., in that city, Oct. 20. He had been associated with the company 62 years.

♦ ♦ ♦

Edward H. Gerberding, 52, who retired in September as assistant treasurer of Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., in Battle Creek, Mich., Oct. 17.

♦ ♦ ♦

George E. Ogilvie, 53, treasurer of the Hockensmith Wheel & Mine Car Co., Penn, Pa., in that city, Oct. 20. A native of Scotland, he had been identified with the Hockensmith company for 10 years.

♦ ♦ ♦

William T. Bentz, retired general sales manager for Elyria Iron & Steel Co. and its successor, Steel & Tubes Inc., Cleveland, in that city, Oct. 23. He retired two years ago, ending 30 years of service with the company.

♦ ♦ ♦

Robert Chelstrom, 59, New England representative of Oster-Williams Co., Cleveland, in an automobile accident near Boston, Oct. 18. He joined the sales organization of the Oster Mfg. Co. in 1924, and when this company merged with Williams Tool Corp. in 1929 he continued as New England representative for both, handling combined lines of threading tools and machines.

EDITORIAL

Business Is Looking Up in Transportation Industries

SIGNS of impending expansion of activity in the movement of freight on the railroads and in the output of automobiles should bring cheer to executives in many branches of the iron, steel and metalworking industries. In 1934 these two major divisions of the nation's transportation system accounted for more than a third of the total consumption of finished, rolled steel. Therefore, any marked improvement in the fields of rail and automotive transport will be of direct benefit to those who produce steel and fabricate or manufacture steel products for these important consumers.

During the past several weeks revenue freight car loadings have been exceeding 700,000 cars weekly. While this represents a modest freight movement in comparison to predepression records, it stands out in sharp contrast with the dismal showing made in 1932, 1933 and 1934. Current loadings are the best reported since the autumn of 1931.

This fact suggests that a comparison of the condition of freight car equipment may be enlightening. In September, 1931, when the railroads were approaching the 700,000-car weeks of October of that year, the number of bad order cars was reported as 187,600 and the "surplusage" of cars was 573,700. In September, 1935, when the carriers were approaching the current 700,000-car weeks, the bad order cars numbered 285,300 and the surplus was 245,200. Moreover, while the average number of freight cars owned in 1931 was about 2,200,000, that number had dwindled to around 1,885,000 for 1935.

Sustained Freight Traffic Exceeding 700,000 Cars Weekly May Force Car Buying

In view of these figures it is apparent that the railroads are not as well prepared to handle 700,000 or more cars per week as they were four years ago. It is the opinion of some transportation experts that continued freight traffic in current volume can be satisfied with existing rolling stock only at the risk of experiencing annoying car shortages in some localities and for certain classifications of cars. In support of this view, it has been reported that in a number of instances carriers recently have had difficulty in delivering enough cars of the right kind to meet the requirements at certain shipping points.

This situation is bound to bring about increased activity in the repair of bad order cars and, in some cases, the purchase of new ones. The material and equipment industries will be benefited on both counts.

Turning now to the automobile situation, we find a somewhat similar accumulation of deficiency. In spite of the gratifying output of motor vehicles in the first seven months of 1935, abundant evidence is at hand to indicate that the slack of demand in the acute period of the depression has not yet been taken up.

Numerous authorities explain the pent-up, unsatisfied demand in various ways, but the theory advanced by L. L. B. Angas, writing in the *Brookmire Commentator* is as plausible as any. This observer declares that a revival in automobile buying is due because of the "crowding" of "normal" replacement demand and "deferred" replacement demand. Normal replacement is that which takes place when the old car has completed its normal, average life of seven years. Deferred replacement is that caused by the fact that during the depression owners postponed normal replacement until the average life of cars was extended to 8 1/3 years—1 1/3 years beyond normal.

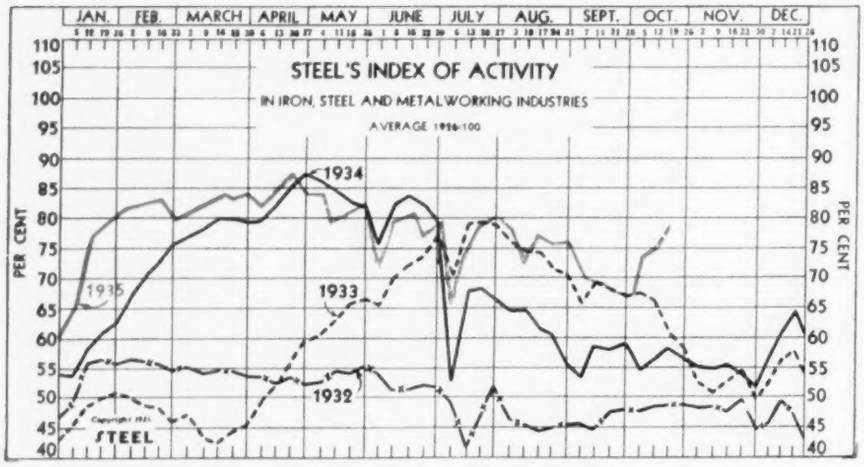
Normal and Deferred Replacement Demand Should Make 1936 and 1937 Good Auto Years

Based upon this reasoning, Major Angas sees a total replacement demand of 9,000,000 cars, which probably will be distributed over the two years of 1936 and 1937. If his prediction is borne out, the industries which furnish materials, parts and equipment for the automobile builders will be in for at least two busy years.

Thus the outlook in the two major branches of America's great land transportation system is distinctly promising. Even if the sobering influence of depression memories prompts some of us to discount the figures to a basis of safe conservatism, the outlook still remains alluring.

After successive years of almost negligible freight car awards and of restricted automobile output, the signs of impending gains should stimulate producers of materials, manufacturers of parts and builders of equipment to renewed efforts to win their share of the increased volume of business. Those who have capitalized their opportunities by taking advantage of improved materials, methods and equipment will be in a preferred position to share the benefits of expanding demand. Others will do well to get busy.

THE BUSINESS TREND



STEEL'S *index of activity in the iron, steel and metalworking industries increased 2.5 points to 77.4 in the week ending Oct. 19:*

Week ending	1935	1934	1933	1932
Aug. 10	73.4	64.6	74.7	44.6
Aug. 17	77.5	61.4	74.2	44.9
Aug. 24	77.0	60.3	71.6	45.2
Aug. 31	77.3	55.1	70.3	45.4
Sept. 7	70.9	53.5	65.5	44.9
Sept. 14	70.1	58.7	69.1	47.8
Sept. 21	69.4	58.1	68.2	48.0
Sept. 28	68.5	59.3	66.9	47.7
Oct. 5	73.3	54.7	67.4	48.4
Oct. 12	74.9†	56.4	66.0	48.7
Oct. 19	77.4*	58.2	60.9	48.7

†Revised. *Preliminary.

The index charted above is based upon freight car loadings, electric power output, automobile assemblies (estimated by Cram's Reports) and the steelworks operating rate (estimated by STEEL.) *Average for 1926 equals 100, weighted as follows: Steel rate 40, and car loadings, power output and auto assemblies each 20.*

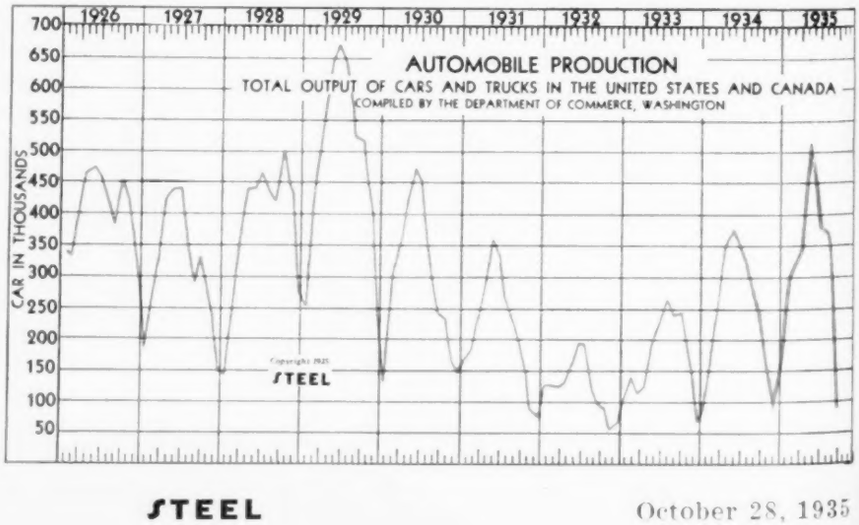
Industry Stages First Real Upturn Since April

INDUSTRY gives every sign of being poised for a sustained forward movement. After seesawing up and down for five months, the principal elements of activity now seem to have gotten together in a semblance of co-ordination and, as the end of October approaches, are staging an impressive upturn.

The current series of weekly gains, which began to attract attention early in the present month, represents the first consistent improvement in activity which has been recorded since late in April. In May, June, July, August and September sporadic gains were offset by frequent losses, so that the net trend in that five-month period was a sidewise movement, with a slightly downward tendency.

Among the business barometers which reflect the October upturn most vividly are revenue freight car loadings, electric power output and assemblies of automobiles. The rise of freight traffic to 734,300 cars for the week ending Oct. 12 and to a total only slightly less than that in the week ending Oct. 19, indicates a freight movement unequalled since the autumn of 1931. With weekly loadings approaching within striking distance of the three-quarters of a million mark, speculation is revived as to the adequacy of the good-order rolling stock of the railroads. It is believed that a continuance of freight movement at the present volume over a number of weeks would reveal car shortages in certain localities for some classifications and would furnish an incentive for more active reconditioning

	1935	1934
January	303,372	162,570
February	358,658	238,827
March	451,809	352,614
April	501,837	371,338
May	385,486	350 616
June	377,065	320,382
July	350,118	276,047
August	247,743	244,715
September	95,128	175,586
October	.....	135,771
November	.....	85,179
December	.....	156,356


1926 1927 1928 1929 1930 1931 1932 1933 1934 1935
AUTOMOBILE PRODUCTION
TOTAL OUTPUT OF CARS AND TRUCKS IN THE UNITED STATES AND CANADA
COMPILED BY THE DEPARTMENT OF COMMERCE, WASHINGTON
CAR IN THOUSANDS
STEEL

and, in some cases, the purchase of new equipment.

Power figures for 1935 present an interesting contrast with those of previous years. The normal pattern of electric power output consists of a generally level curve, with numerous minor ups and downs, for the first 11 months of the year, and a marked rise in December to a peak which usually occurs on the Friday or Saturday preceding Christmas day. The curve then falls sharply over the year end and resumes its normal position before the middle of January.

However, power output in three consecutive weeks—the weeks ending Oct. 5, 12 and 19—have exceeded all previous records. Therefore, if output over the remainder of the year conforms to the normal seasonal pattern, the total in the third week of December should rise to a phenomenally high point.

The implications of the record of power consumption in 1935 cannot be anything but reassuring to those companies engaged in the manufacture of industrial and household electrical equipment and appliances.

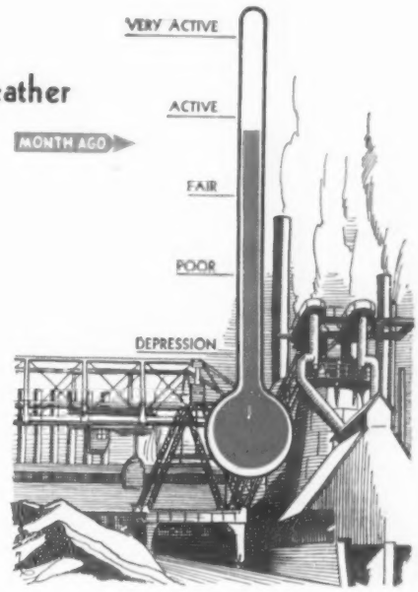
Automobile output, which was curtailed sharply in August and September, is being stepped up rapidly as November approaches: Resumption of activity in this important field is almost a guarantee of improved business generally for many other industries over the remainder of the year.

Where Business Stands

Monthly Averages, 1934—100

	Sept., 1935	Aug., 1935	Sept., 1934
Steel Ingot Output	139.3	133.1	61.6
Pig Iron Output	134.7	129.6	68.4
Freight Movement	111.2	105.8	106.2
Building Construction	168.1	169.6	98.1
Automobile Output	39.5	102.7	72.1
Wholesale Prices	109.6	107.7	101.8

Industrial Weather



TREND:
Upward

The Barometer of Business

Industrial Indicators

	Sept., 1935	Aug., 1935	Sept., 1934
Pig iron output (daily average, tons)	59,009	56,767	29,969
Machine tool index	108.5	112.2	37.4
Finished steel shipments (tons)	619,933	624,497	370,306
Ingot output (daily average, tons)	113,193	108,123	50,065
Dodge building awards in 37 states (sq. ft.)	21,365,700	21,545,400	12,499,300
Auptomobile output	95,128	247,743	174,451
Coal output, tons	24,886,000	26,112,000	27,772,000
Business failures; number	806	910	790
Business failures; liabilities	$21,837,926	$17,845,596	$16,440,147
Cement production, bbls.		7,235,000	7,680,000
Cotton consumption, bales		408,410	296,000
Car loadings (weekly av.)	657,890	626,246	628,453

Financial Indicators

	Sept., 1935	Aug., 1935	Sept., 1934
25 Industrial stocks	$183.21	$177.33	$129.47
25 Rail stocks	$28.37	$27.96	$27.30
40 Bonds	$81.97	$81.93	$78.71
Bank clearings (000 omitted)	$20,979,895	$22,347,540	$17,938,787
Commercial paper rate, New York (per cent)	¾	¾	1
*Commercial loans (000 omitted)	$7,512,000	$7,315,000	$7,793,000
Federal Reserve ratio, per cent	75.2	75.1	70.1
Railroad earnings	†$42,073,256	$26,851,397	$39,677,337
Stock sales, New York stock exchange	34,748,310	42,923,190	12,635,980
Bond sales, par value	$250,189,800	$283,270,600	$286,485,800

*Leading member banks Federal Reserve System.
†August, July and August, respectively.

Foreign Trade

	Sept., 1935	Aug., 1935	Sept., 1934
Exports		$172,204,000	$191,690,000
Imports		$170,139,000	$131,659,000
Gold exports		$102,000	$22,255,000
Gold imports		$46,084,999	$3,585,000

Commodity Prices

	Sept., 1935	Aug., 1935	Sept., 1934	Aver. 1913
STEEL's composite average of 25 iron and steel prices	$32.82	$32.68	$32.15	$26.32
Bradstreet's index	$10.17	$10.00	$9.45	$9.21
Wheat, cash (bushel)	$1.07	98c	$1.17	92c
Corn, cash (bushel)	$1.03	97c	93c	51c
Petroleum, crude (bbl.)	98c	98c	98c	$2.59

ROTARY CROSSED AXES SHAVING

Offers a Practical and Economical Means of Finishing Gear Teeth Accurately at Low Cost

BY R. S. DRUMMOND
National Broach & Machine Co.

A method of making commercial gears to the same quality standards that hitherto have applied only to such units as automobile transmissions is described in the accompanying abstract of a paper presented before the American Gear Manufacturers association at Wilkinsburg, Pa., May 14.

I ONCE heard a gear defined as the result of compounding steel and errors. We know that no practical method of gear cutting can consistently produce a mathematically perfect product. The normal errors are tooth profile, index, eccentricity, helical angle and tooth finish, all measured usually in tenths. However, in spite of their microscopic order, these errors are apt to be serious, especially in a world which has suddenly become acutely conscious of gear noise.

The object of rotary crossed axes shaving is the economical reduction of gear errors to a value which is negligible. This is accomplished by correcting the proportions and finish of the gear teeth. The result is less gear noise, longer gear life and more accurate mechanical operation.

One of the basic ideas behind this method of gear finishing is the crossing of the axes of cutter and work gear. In crossed axes shaving, the work gear is rotated under only slight pressure with a special cutter or tool in the form of a gashed helical gear, the work gear and the cutter having different helical angles.

The angle made by their axes in the machine setup is equal to the difference in their helical angles, normally 10 to 15 degrees, although this range may be extended on both sides of the limits given. The cutter is normally mounted with its center over the intersection of the axes of the two shafts in order to assure correct tooth profile and helical angle in the gear being cut.

The relation of the axes compensates for the variation in sliding action due to the involute roll. As gear and cutter tooth are brought together cutting continues toward the pitch line up to the center point and in the reverse direction as they pass that point and separate. Thus uniform cutting is assured over the entire tooth profile.

Cutting can be rapidly increased by spreading the angle between the axes, but doing this tends to sacrifice guiding action and to reduce the width of the contact zone. Conversely, guiding action can be increased by reducing the angle between the axes, but this rapidly reduces the freedom of cutting until at a zero angle cutting is replaced entirely by burnishing.

A real value in crossing the axes is the limiting of the contact pressure required in cutting and the accurate guiding of the cutting edges of the gaged tool.

Contact Area Decreases

When two parallel cylinders of the same length are forced together, their contact surface is a rectangle the length of which is the length of the cylinders and the width of which varies with their diameters, contact pressure and elasticity. As the angle of these cylinders is increased from zero to 90 degrees the contact plane remains a parallelogram but its area steadily diminishes to a minimum at 90 degrees.

It is also obvious that as the angle between the axes is increased, it will be necessary to decrease gradually the total pressure between the cylinders if the unit pressure on the plane of contact is to remain constant.

At a crossing angle of 10 to 15 degrees, the required cutting pressure is only a small fraction of what it would have to be if the axes were parallel.

It is true that in the case of the cylinders mentioned the contact surface is parallel with the axes, while the actual contact of two mating gears is along the tooth profile in a plane more nearly vertical to the gear axes. That, however, does not change the working pressure relationship and its contingency on axial angularity. The pressure normally exerted between gear and cutter at angles from 10 to 15 degrees is approximately 40 pounds.

When gears are processed by the use of high hydraulic pressure, the elimination of index or eccentricity

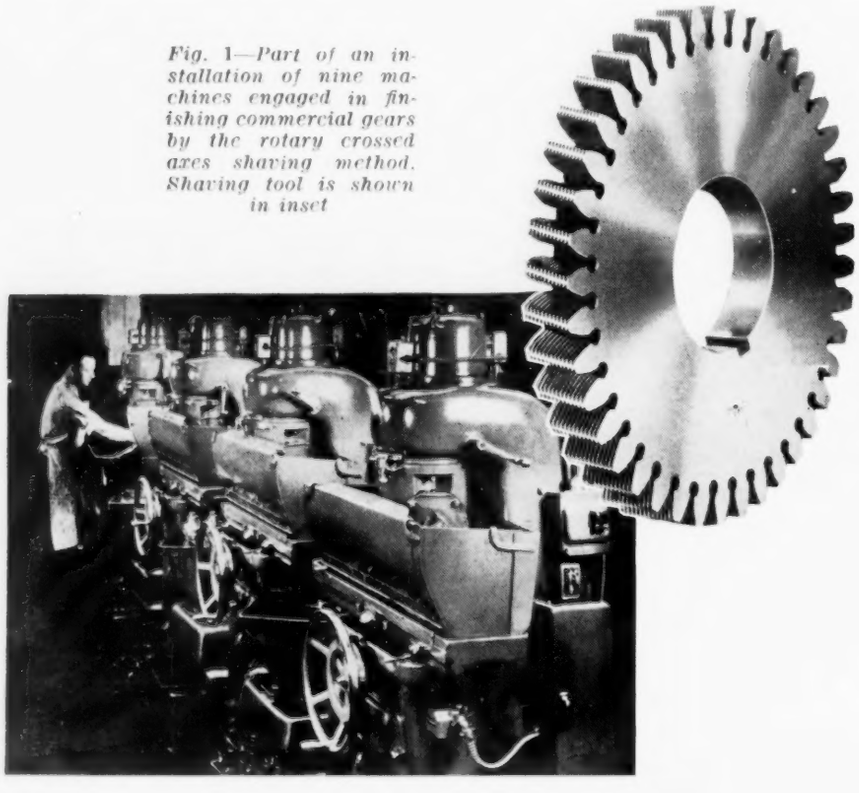


Fig. 1—Part of an installation of nine machines engaged in finishing commercial gears by the rotary crossed axes shaving method. Shaving tool is shown in inset

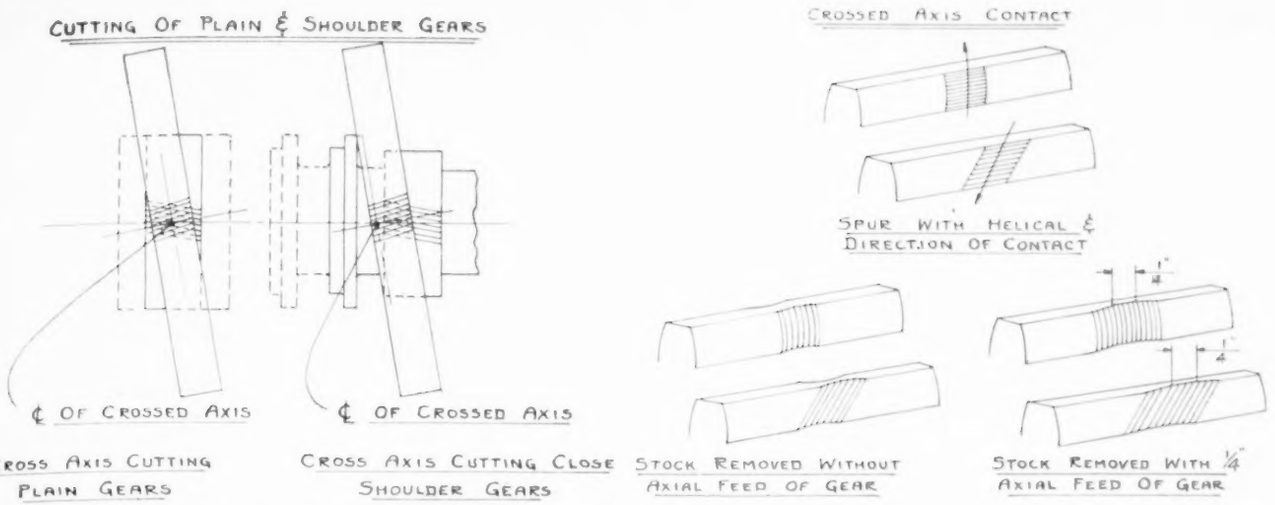

CUTTING OF PLAIN & SHOULDER GEARS
℄ OF CROSSED AXIS
℄ OF CROSSED AXIS
CROSS AXIS CUTTING PLAIN GEARS
CROSS AXIS CUTTING CLOSE SHOULDER GEARS
CROSSED AXIS CONTACT
SPUR WITH HELICAL & DIRECTION OF CONTACT
STOCK REMOVED WITHOUT AXIAL FEED OF GEAR
STOCK REMOVED WITH 1/4" AXIAL FEED OF GEAR

Fig. 2—These drawings with the accompanying captions illustrate the basic principles underlying rotary crossed axes shaving

errors is impossible, due to the flexibility of the material being cut. The cutter actually rides up and down over the surface as the work rotates.

In the rotary gear finishing machines shown in Fig. 1, the cutter head has its own separate drive, with motor located at the top. The table is fed and reciprocated by its own motor, which, incidentally, is smaller than the unit driving the head. The pressure lubrication system is driven by a third motor located at the base of the column.

The table feed mechanism raises the table vertically at the end of each stroke as the cutter passes out of pressure contact with the work gear. Each increment of vertical feed is under complete control. A Telechron timing mechanism controls the number of horizontal table strokes. The machine can be set to stop automatically when the desired number of cuts has been taken. Furthermore, any number of idling strokes may be interspersed in the cycle of operation.

With the machine on cutting stroke, the surface produced on the work gear has minute lines traveling up the tooth from bottom to top. These indicate the spacing of the cross travel of the work per revolution. Inasmuch as the cutter contacts the work at a different point on each stroke, these lines are completely removed by one or more idling strokes after the actual cutting operation is completed. The final result is a smooth, mirror-like finish on the work gear tooth but without the compression effect of heavy pressures. A gear tooth finished in this manner requires no additional processing.

The correct angularity between

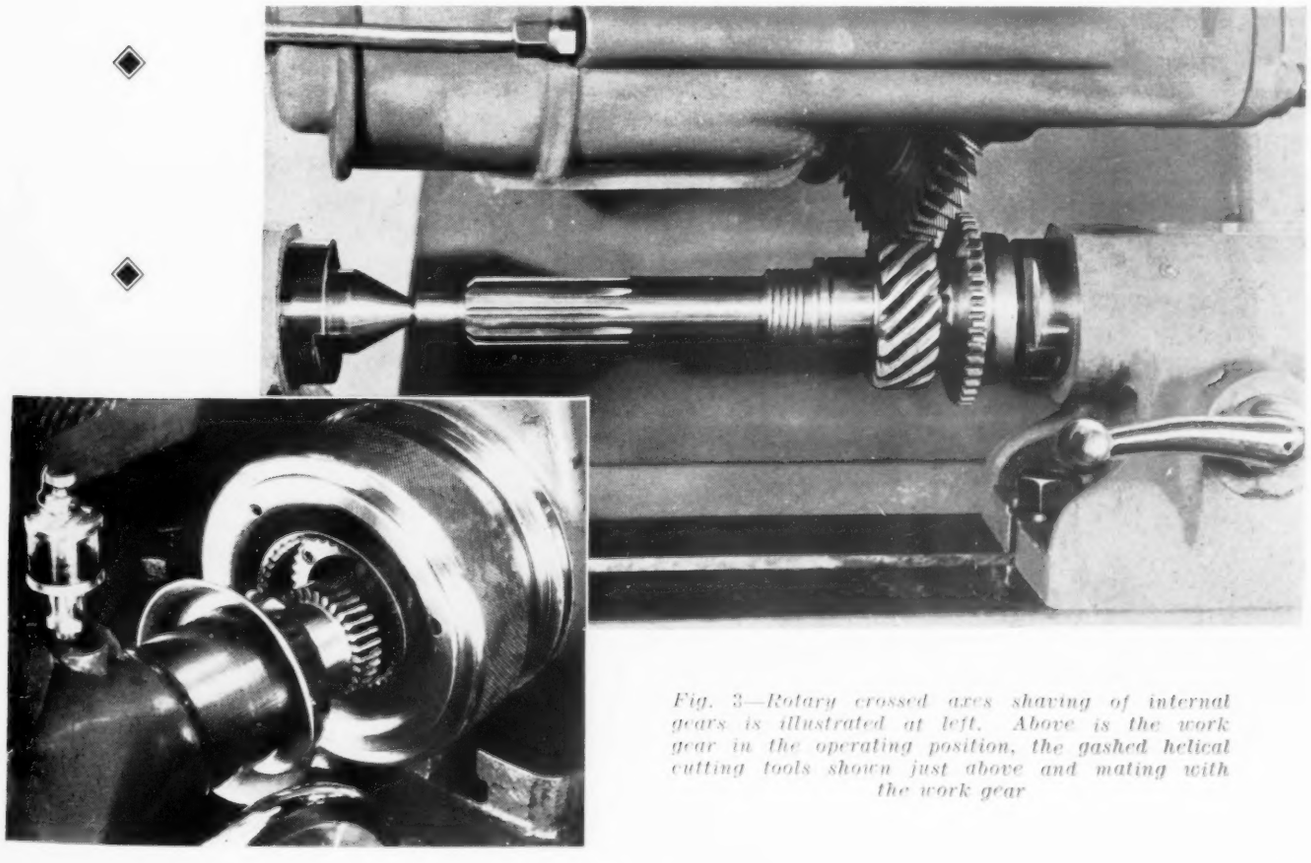


Fig. 3—Rotary crossed axes shaving of internal gears is illustrated at left. Above is the work gear in the operating position, the gashed helical cutting tools shown just above and mating with the work gear

axes is accomplished in the machine head setting. In addition to the ordinary vernier scale for setting the head an accurate indicator is also provided. This bears on a button so that when the first sample gear is checked any slight variation in angle can be corrected by revising the head setting.

The work gear mounted on live centers is driven and guided by the cutter; no other drive connection exists between them. No dependence is placed on the accuracy of gear trains or other mechanical elements in this operation. The profile of the gear, its angle, index and eccentricity are determined solely by similar functions of the cutter itself.

Cutter Speeds High

At the end of each table stroke, the direction of cutter rotation is reversed. This assures similar characteristics in the profile of each side of each tooth. Cutter speeds are considerably higher than might normally be expeted. In many instances cutters are run at 400 surface feet per minute.

Rough gashing of a gear invariably leaves certain cutting strains in the surface metal of the gear teeth. These strains, relieved in the heat treating operation, are very often responsible for final distortions which appear as errors in the finished gear. It is important to know that the shaving process, with the gear operating at high speed and light contact pressure, almost completely eliminates these initial cutting strains. Minute, hairlike shavings are taken from the gear tooth surfaces in a manner much the same as that effected by a fly cutting tool. Obviously the finer the cuts made the less pressure is required between cutter and work.

The shaving tool itself, shown in the inset in Fig. 1, looks like a normal helical gear gashed at right angles with its axis. The gashes extend from top to bottom of each tooth with a clearance space at the base of the tooth. This tooth base clearance not only provides unrestricted flow of lubricant to wash out the chips, but also facilitates the gashing operation itself.

Tooth gashing for this purpose is not new. In times past gashes have been made in various positions and at angles all the way from 90 degrees with the axis of the cutter to a position parallel with the axis. It is generally conceded that the location of the serrations or gashes, while of importance, is not the principal factor in the successful operation of the tool.

It has been found possible to produce cutters with an accumulative error not to exceed 0.0003-inch. Present practice is the result of a very extensive program of research and experimentation which thus far has cost in the neighborhood of $50,000 and is fully covered patent-wise. This subject is considerably involved and will not be taken up in detail in this article. It includes not only the proper angular relationship of the axes but also tooth profile, gash width, back-off angles, face angles, pressure of contact, etc.

Our experimental work disclosed clearly that reduction of contact between the tool and the work is of great importance and this is greatly facilitated by the use of crossed axes cutting in which the band of contact is narrowed up, presenting only a few cutting blades against the work teeth.

Study Effect of Wide Lands

A very important item connected with this was the effect of wide lands on the cutters in combination with parallel axes cutting, in which the shafts of the work and cutter are parallel. In this work the highest tooth pressures are necessary and the burnishing effect was proved to be so severe that the rebound from heat treatment gave very irregular results, even though the finish was quite smooth.

The completed cutter today has an accuracy equal to that of master gear parts. These tools also have a very high surface finish.

Life of a cutting tool is unusually high. Normally, 6000 to 12,000 work pieces can be produced before it is necessary to regrind the cutter. In normal pitch sizes, a cutter may be reground a number of times. In five pitch cutters, seven to ten regrinds are practicable, thus making a total of 42,000 to 100,000 work pieces per tool.

As previously stated, chips shaved off the gear tooth surface are hairlike in dimensions. They are normally twisted from end to end instead of being coiled in clock-spring fashion. This is the result of the angular setting of the axes of cutter and gear.

Lubricant Is Strained

Prompt evacuation of these hairlike chips presented a very definite problem early in the development of this machine. The chips are so light that they easily are carried in suspension by the cutting lubricant. Consequently a very careful straining of the lubricant is necessary to prevent chip return to the cutter faces. A series of strainers and baffles completely solves this problem. A continuous flow of lubricant is provided on both sides of the cutter contact in order rapidly to wash out all chips immediately after they are formed. A relatively high oil pressure is used for this purpose.

Samples of gears shaved by the rotary gear finishing machine are shown in Fig. 4. In one of them, cut without reciprocating the table, the band of contact between cutter and work is less than the face width of the gear; furthermore, the direction of this band is up the face of the spur tooth and diagonally across the face of the helical tooth. These bands correspond to a line perpendicular to the momentary contact between similar gears. Momentary contact on the spur gear tooth is parallel to its axis.

On a helical tooth the straight lines of contact run up the tooth at an angle varying with the helix angle. The bands of contact shown on the samples at the right in Fig. 2 are at right angles to these lines of momentary contact. If cut on parallel axes, these bands would cover the entire face of the tooth in a complete revolution. With axes at 90 degrees the band theoretically would be a line. Practically, it would be a very narrow surface. Between zero and 90 degrees, the width of the band would correspond to the angle.

If the samples above referred to were measured, it would be found that the cut is deeper at the center of the band than it is at the edges. The profile of the cut would be concave. The center blades cut deeper than those cutting on either side. If, instead of allowing the table to remain stationary, we take a similar cut with a reciprocation of ⅛-inch, the cutter blades will work to a uniform depth for ⅛-inch and the balance of the cut will taper off to a

(Please turn to Page 40)

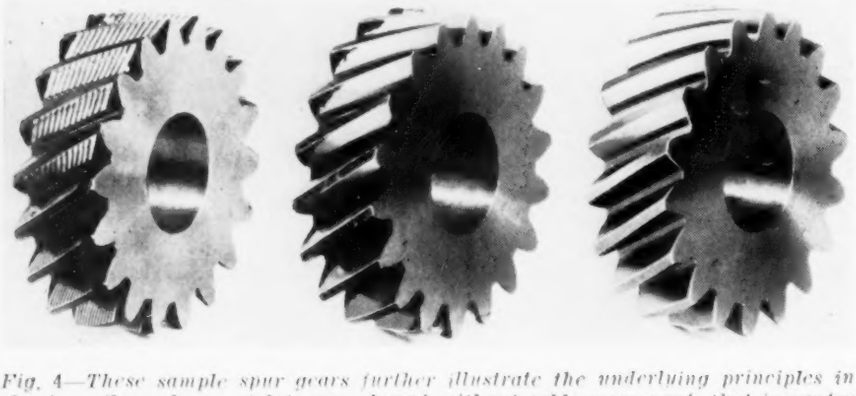
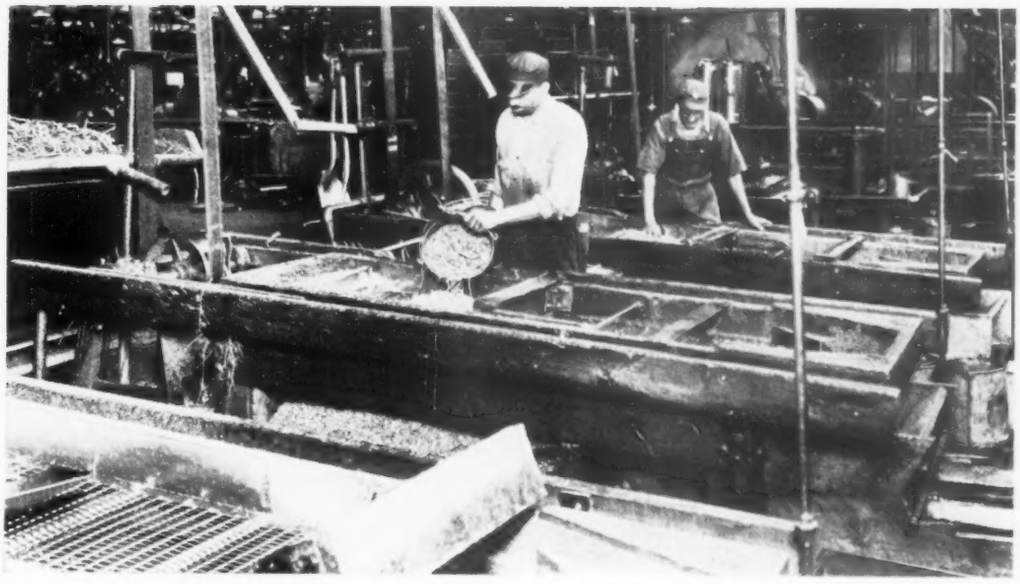


Fig. 4—These sample spur gears further illustrate the underlying principles in shaving. Gear shown at left was shaved without table movement, that in center with ⅛-inch table movement while gear at right was shaved complete



MIXTURE of chips, bar ends and stray machined parts, after being separated from excess oil, is placed on perforated metal shaker tables where heavier parts are thrown to the top and can be removed

Cleaning System Promotes Longer Tool Life, Reduces Cutting Oil Bill

AN INCREASE of 8 per cent in the life of cutting tools as well as the salvage of much cutting oil which formerly was wasted has been effected by the National Acme Co., Cleveland, through a complete oil cleaning system which has been installed recently.

By the use of work chutes the finished screw machine product is kept separate from the chips in the screw machine as much as possible. However, some of the finished parts do fall into the chips. This mixture of chips, oil and bar ends is taken in buckets from the automatic screw machine to the cleaning department. There they are first thrown into Leon J. Barrett chip slingers, which remove the oil from the chips by centrifugal force. The chips then are thrown onto perforated metal shaker tables where the vibration throws the heavy parts to the top. There the bar ends can be taken out of the chips as they have a higher scrap value than the chips. Any stray screw machine products which are still in the chips are also separated therefrom and sent to inspection.

Oil from the chip slingers and the oil taken from the large oil reservoir in the bottom pan of the automatic screw machine, removed at the end of the run, is drained into a large welded steel storage tank located under the shop floor. This tank is equipped with perforated steel baffle plates placed vertically and spaced about 12 inches apart. The purpose of this tank is not only to provide storage capacity for the quantity of oil which must be kept on hand but also to permit the heavy sludge from separating out. The baffle plates serve to keep the sludge from flowing out of the tank when the oil is removed.

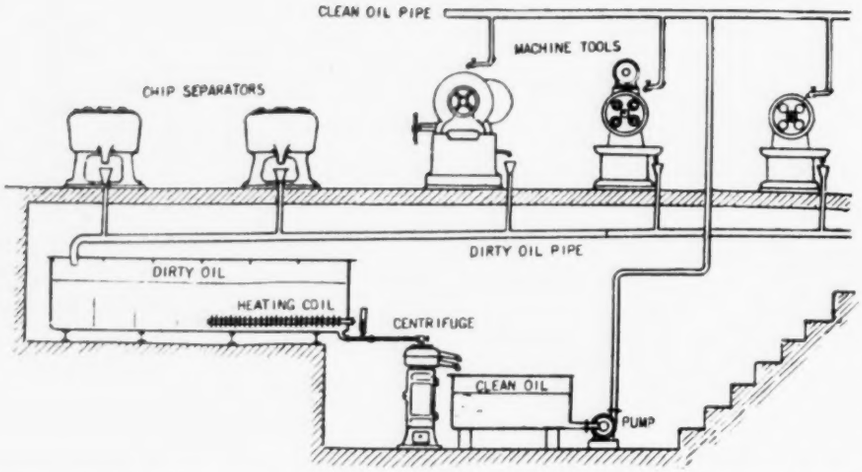
Barrett chip slinger which removes oil from chips by centrifugal force

At periodic intervals, oil is drained from the storage tank into a heating tank where, by means of a steam-heating coil, a batch of about 500 gallons will be brought up to a temperature of approximately 180 degrees Fahr. This serves to sterilize the oil and has been found a most effective method of preventing skin infections upon the screw machine operators. The higher temperature also gives much better separation in the centrifugal separator because of the increased difference between the specific gravity of the oil and the dirt which is to be removed.

Prepares Oil for Re-Use

Oil from the heater tank is drained out by gravity into a centrifugal separator, developed by National Acme, known as the positive separator. This separates chips, sludge and water from the cutting oil and renders it clear, clean and ready for further use.

A feature of this centrifuge is that the machine is designed for easy cleaning of the bowl. The bowl is made large so that it has large dirt capacity and will run for a considerable period of time before cleaning is necessary. When it has to be



Contemplated layout for continuous oil cleaning system serving battery of screw machines

cleaned, the bowl is swung out of the machine on the door and is thereby supported so that the operator can take the cover off the bowl without actually touching the bowl which is hot, and it is not necessary for the operator to wait for the bowl to cool before cleaning it out. The bowl can be cleaned and the centrifuge put back into operation in approximately 15 minutes.

The centrifuge operates at approximately 9000 revolutions per minute, producing a pressure on 1 pound of cutting oil in the bowl of approximately 4½ tons. This makes for both rapid and complete separation.

The centrifuges are also manufactured in smaller sizes for smaller installations and for laboratory work, relative capacity of the three standard sizes being 50, 200 and 600 gallons per hour. The exact capacity depends on the viscosity of the cutting oil used. The same type of centrifuge can, of course, be employed for separating grit from grinder compounds.

When the centrifuge is used in plants where heat treating oil also must be treated occasionally, it can be furnished on a platform for portable use, the small pump being mounted on the platform to pump the liquid into the centrifuge.

Plan More Frequent Cleaning

A change in the method of handling cutting oil is now under consideration by the company. The plan is to use the oil once and then circulate it through a centrifuge and clean it thoroughly without putting it back through the machine again. Under the present system, it is used over and over until the end of the run. The oil picks up and holds in suspension fine abrasive particles of metal, which can be seen only by the use of a magnifying glass, these coming both from the stock being cut in the form of minute chips and also from the cutting tools, being the particles of high-speed steel that wear off the cutting edges.

Further Increase in Tool Life?

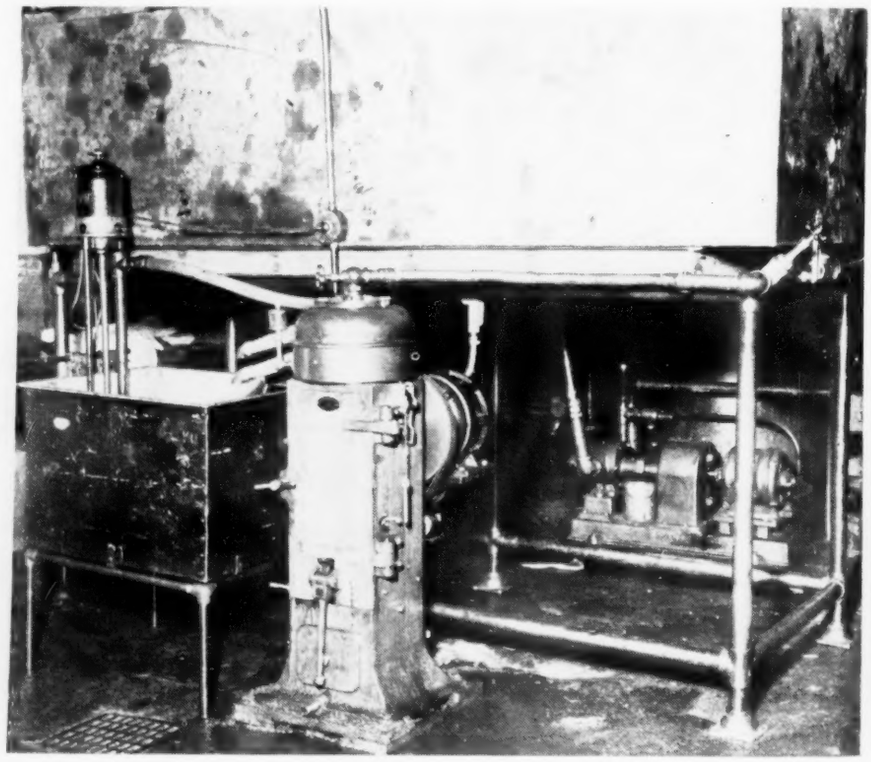
The oil also accumulates a considerable quantity of lint and dust and, therefore, develops characteristics of a lapping solution. The substantial increase in the life of cutting tools, which is now obtained by periodic cleaning, probably will be increased still further if the oil is cleaned every time it passes over the cutting tools.

An accompanying sketch shows the contemplated layout for a continuous oil cleaning system. It represents the system now in use at National Acme with the single exception that the pump and piping system for returning the oil to machine tools are elements to be installed at a later date.

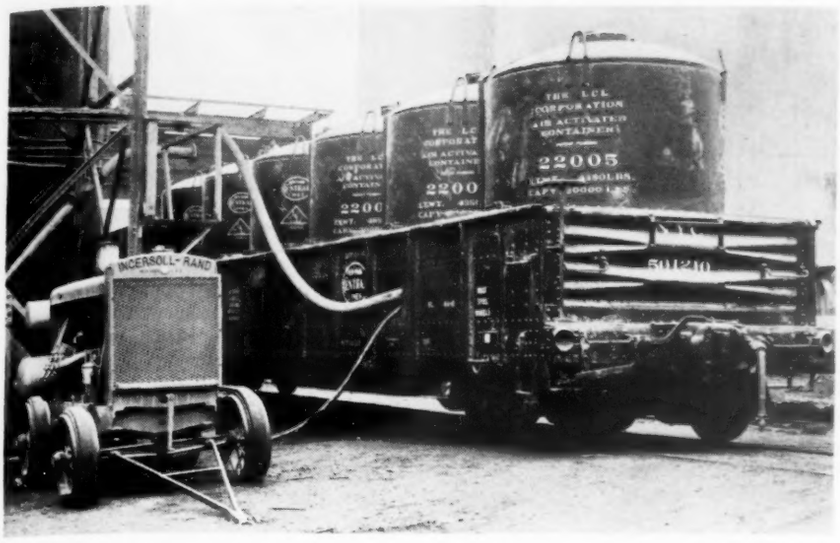
Show Products at Exhibit Of Industrial Materials

The third annual Industrial Materials exhibit at the Hotel Astor New York, Oct. 21-26, attracted interest of metalworking manufacturers. The exhibition covered such items as plain and alloy steels, screw machine products, bearings, composition materials exhibit at the Hotel Astor, New industrial felt and chemicals and various other products.

Approximately 20 companies had displays. They included the Carborundum Co., Niagara Falls, N. Y.; Norma Hoffmann Bearings Corp., Stamford, Conn.; Bakelite Corp., Bound Brook, N. J.; American Steel & Wire Co., Cleveland; Peter A. Frasse & Co. Inc., New York; Parker-Kalon Corp., New York; Ericsson Screw Machine Products Co., Brooklyn, N. Y.; Mt. Vernon Die Casting Co., Mt. Vernon, N. Y.; American Felt Co., New York; Spaulding Fibre Co. Inc., New York; Stackpole Carbon Co., St. Marys, Pa.; Maas & Waldstein Co., Newark, N. J.; Boonton Molding Co., New York; and B. F. Drakenfeld & Co. Inc., New York.



Centrifugal separator which removes fine chips, sludge and water from the cutting oil and renders it clear, clean and ready for further use



Air-activated container for handling cement and other bulk materials. About 9 feet in height and 7½ feet in diameter, they are mounted six to a car, each weighing 4200 pounds empty. Cement is loaded through the top from bins and is discharged through a 4-inch outlet pipe at the bottom, by means of compressed air

Less-than-Carlot Shipping Containers Gaining Favor

BY B. K. PRICE
Associate Editor, STEEL

INCREASING application of less-than-carlot containers for bulk and package materials promises a growing outlet for steel. Since first on the market about 15 years ago more than 20,000 of these containers have been placed in use. They average about 1½ tons of steel each. This would mean on an average for the entire 15 years 2000 tons annually; however, as the first several years were given over largely to pioneering and promotional work, the actual production of these containers fell principally in more recent years, with a result that substantially more than 2000 tons is now being consumed yearly.

The container method of handling freight is designed to facilitate speed, safety and economy; to provide a transport unit that will carry freight without interruption from producing plant to the door of the consumer, if need be. While the containers vary in size and shape depending upon the uses to which they are to be placed, they fall in general into several broad classifications, including merchandise, refrigerator, coal and air activated containers, the latter for handling cement, malt, flour and the like.

Originally, some containers were made of plywood, but practical experience soon proved the desirability of steel for this purpose, and now, it is interesting to note, the use of stainless-clad steel has come in for experimental work on containers for flour and other powdered foodstuffs.

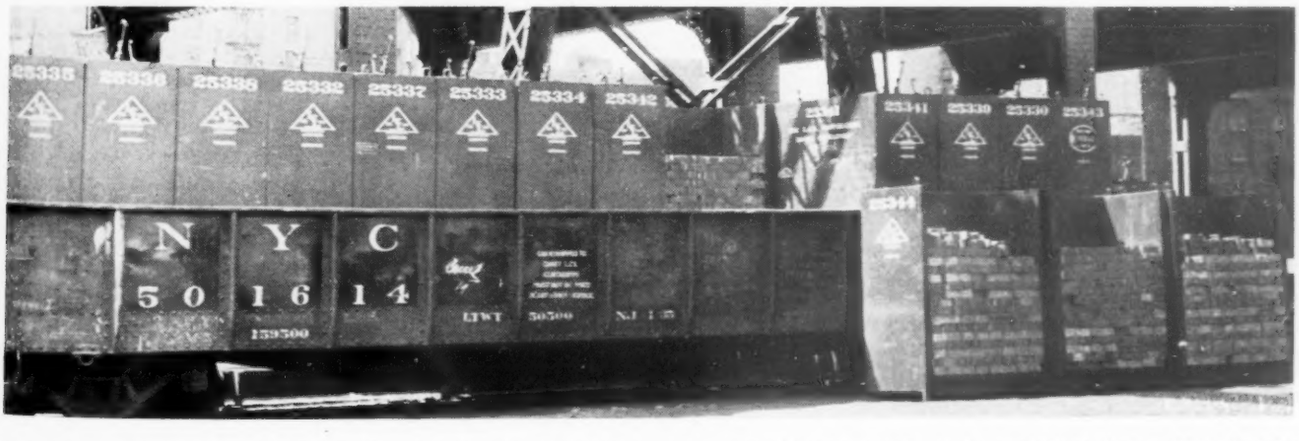
Possibly the latest type of container to have received practical test is the air activated container in connection with the transportation of cement. For some years bulk cement had been handled in drop-bottom containers, but in some cases under certain conditions these containers were not economical, due to the necessity of having a crane for handling the operation.

Welded Steel Cylinders

About three years ago the L.C.L. Corp., New York, a pioneer in this field, in conjunction with the Kennedy Van Saum Mfg. & Engineering Corp., also of New York, started the development of air activated containers, which under practical operation in recent months have proved successful, it is said. This type is illustrated herewith. They are cylinders 9 feet 1 inch overall in height and 7 feet 6 inches in diameter, with waterproof tops, and are made of black steel sheets, welded. They are equipped with proper locking devices and with openings at the bottom for discharge of cement through a 4-inch outlet pipe, together with proper connections for air which may be supplied by a portable compressor. There are also mixing nozzles graduated for three speeds to control the final cleaning out of the cement.

This type weighs about 4200 pounds each and may be mounted six to a car upon a low-side gondola of 70-ton capacity. Such containers are mounted in pockets so as to make impossible any motion

(*Please turn to Page* 43)



All-steel containers for handling tiered brick in less-than-carlots. Of 12-gage steel, each container holds 1500 brick; there are 22 to the car

POWER DRIVES

Restock Replacement Parts

During the period of low production when economy was the management's code the stock of replacement parts was permitted to dwindle down to nothing. In many plants other idle equipment was often robbed of essential parts and none ordered to replace them, a condition which may ultimately be responsible for seriously interfering with getting production back to normal.

With the present tendency toward resumption of normal operations transmission and maintenance engineers having no replacement parts on hand and nothing idle to rob will do well to attempt to stock up, especially on some of the items more difficult to replace. Of course, manufacturers and distributors have been carrying larger stocks and providing quicker service but these are poor consolation when the big boss is "up in the air" because an important machine is down.

As an experiment, and perhaps for self protection, why not put through a requisition for stock for several essential items which are in frequent demand with a memorandum explaining the advisability of stocking up and, perhaps, the length of time required to obtain them in an emergency? With this as a starter and particularly if some of the items requisitioned "save the day," or are badly needed, it may be easier again to build up the stock of replacement parts to a safe volume. It is surprising how the lack of an apparently insignificant item can sometimes tie up a department or a whole shop.

• • •

Narrow Pulleys

When trying to meet modern production requirements on old machines without rebuilding to incorporate chain drives or V-belts it is not unusual to find that the drive pulley is too narrow for a flat belt of the necessary width. Heavier belts are often too stiff to grip pulleys of small diameter and so cannot be substituted.

One method which has been applied in numerous instances in solving this problem is to use a well-worn-in leather belt next to the pulley to provide a good driving grip. As this belt may not have sufficient strength to maintain the necessarily high tension, a flexible over-riding belt of some non-stretch material is laced tightly over the flexible belt. There is no slip between the two belts and together they provide the two factors necessary in any effective belt drive, pulley adhesion and belt tension.

Some of the newer types of special belting and tannages combine flexibility to give grip or adhesion to the pulley and practical freedom from stretch to maintain the tension. Capacity of such belting is higher than that of ordinary leather belting, so that usually it can be accommodated on the narrower pulley.

• • •

Preparing for Motor Changes

Any of the following four schemes simplifies and helps to reduce time down for maintenance and repairs to lineshaft drives.

1—On modernized group drives where lineshafts are not over 30 to 40 feet long mounting the motors at the shaft end and over the aisles permits easy access without interference from machines or piles of work.

2—The use of elevating or tiering machines by the maintenance men to raise or lower motors and also as a platform to work on speeds up erection or changes of motors.

3—Standard lineshaft speeds and keeping pulleys of the correct diameter on spare motors to give the proper speed reduction ratio save hunting up and installing a pulley whenever a change is to be made Drive pulleys on lineshafts must also be made of a standard diameter to permit this.

4—Jack type disconnect switches in the motor leads are not only time savers when making a change but also are an important safeguard for men while working on the motor or lineshafting.

Planning ahead is one of the best methods of reducing maintenance.

• • •

Short Center Drives

In the urge to obtain short center belt drives which permit compact construction and close mounting of motor and its machine, the limitations of such drives are often neglected. Short centers decrease the arc of contact of belt on the smaller, usually the driving, pulleys. Since the power transmitted depends upon tension and contact with the driver, either less power is transmitted by the drive than would be with longer centers, or some auxiliary device or scheme is used to increase the tension or surface contact. A number of types of equipment are available for one or both of these purposes. Of course the size of the belt and pulley may be increased sufficiently to compensate for the decrease in transmitting capacity.

One of the popular types of short center drive devices of today, which is used mainly with flat and V-belts, pivots the motor base in such a manner that an even fixed tension is maintained in the belt by the rotation of the motor on its pivots, irrespective of variations in length of the belt because of elasticity and changes in load. This provides in reality a variable center distance device, automatic in operation, which changes the center distance, by rotation on the pivots, to compensate for the lengthening or shortening of the belt under the variations in load.

Such devices not only improve the operation but also increase the efficiency of operation under shock load, intermittent, on-and-off load, starting under-load, and other unusual or severe requirements as the drive can take care of the variation in load without excessive slippage or slowing up. Metalworking plants find these drives of especial advantage on air compressors, shears, punch presses, and other metal processing equipment where the power requirement fluctuates widely.

• • •

Oilers have a definite responsibility. This position, therefore, requires men who can be trusted to perform their duties faithfully even though they work alone and checks on performance can be made only with difficulty.

• • •

Most drive trouble can be traced back to poor engineering on the installation, improper maintenance, or difficulty with or faulty operation of the machine driven.

• • •

One of the best maintenance policies is to provide a competent man whose chief duty is to keep eyes and ears tuned for anything out of the ordinary and not to give so much other work that he cannot cover the plant daily.

• • •

Success of any power drive depends upon: Does it operate the machine satisfactorily, economically, and with a minimum of maintenance?

METHODS AND MATERIALS

Lift Truck Weight Reduced To Meet Special Service

To meet severely restricted floor loading limits without reducing the desired load carrying capacity of a fork tiering truck was a problem which recently confronted the Elwell-Parker Electric Co., Cleveland. Loads up to 1800 pounds were to be handled by the truck. A standard truck of the required capacity when loaded exceeded the floor loading limit by approximately 860 pounds when equipped with lead-type storage batteries and by 500 pounds when equipped with alkaline storage batteries. Use of the alkaline battery was thus the first step in meeting the problem.

Elimination of the remaining 500 pounds of excess deadweight called for a structural material of lighter weight but of equal strength. The light, strong alloys of aluminum were the answer. The designer substituted aluminum for all the major weight-consuming parts with the exception of two castings and an angle brace. More than 500 pounds was saved. This not only solved the problem, but also reduced power requirements by the amount formerly required to haul the one-fourth ton of deadweight.

The approximate net saving in power requirements effected by the aluminum alloys was 10 per cent and by the alkaline battery, in which nickel and steel are the principal structural weight savers, 7 per cent, a total of 17 per cent.

* * *

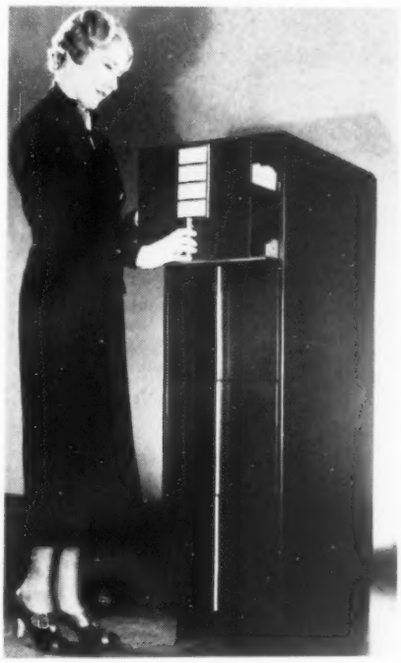
Spray Painting Simplified By Gang Mixing Tanks

Economical spraying of bed springs and other large products in different colors is made possible by the Binks Mfg. Co., 3114 Carroll avenue, Chicago, by utilizing a series of mixing tanks, each with a different color of paint or other finishing material. The paint in these tanks is kept in a constant state of agitation by a motor driven shaft line connecting by a V-belt drive to the agitator shaft of each tank.

At first one pump was intended to serve to carry the material from all four tanks to the spray nozzles. Subsequent research has proved the necessity of a separate paint circulating system for each tank. Paint is pumped from a bottom outlet of the tank and projected through the spray nozzles. Whatever material fails to adhere to the product being finished is reclaimed in a tank and after having been passed through a filter is recirculated back to a top inlet in the mixing tank.

* * *

Enlivened Office Furniture



EXECUTIVE FILING CABINET, restyled by Wilbur Henry Adams, industrial designer, Cleveland, for the Berger Mfg. Co., Canton, O., subsidiary of Republic Steel Corp., incorporates many new features. A receding base allows for toe room, continuous tubular handles entirely up the front of the cabinet permit easy drawer opening, and the four index cards on the top drawer facilitate quick reading of the contents of the file, without the usual stooping to read the bottom card. The cabinet is all metal, finished in maroon with black base and stainless steel handles.

Blister-Proof Plastic Has Molded-in Metal Sheet

A new heat-resistant material suitable for application on bar, counter and table tops or any other surface likely to come in contact with lighted cigarets and cigars has been developed by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Known as Blister-Proof Micarta, it is made by molding a thin metal sheet directly beneath the surface of the Micarta plate. This sheet acts as a rapid conductor of heat, preventing high temperatures in local spots which otherwise might cause blistering of the material.

* * *

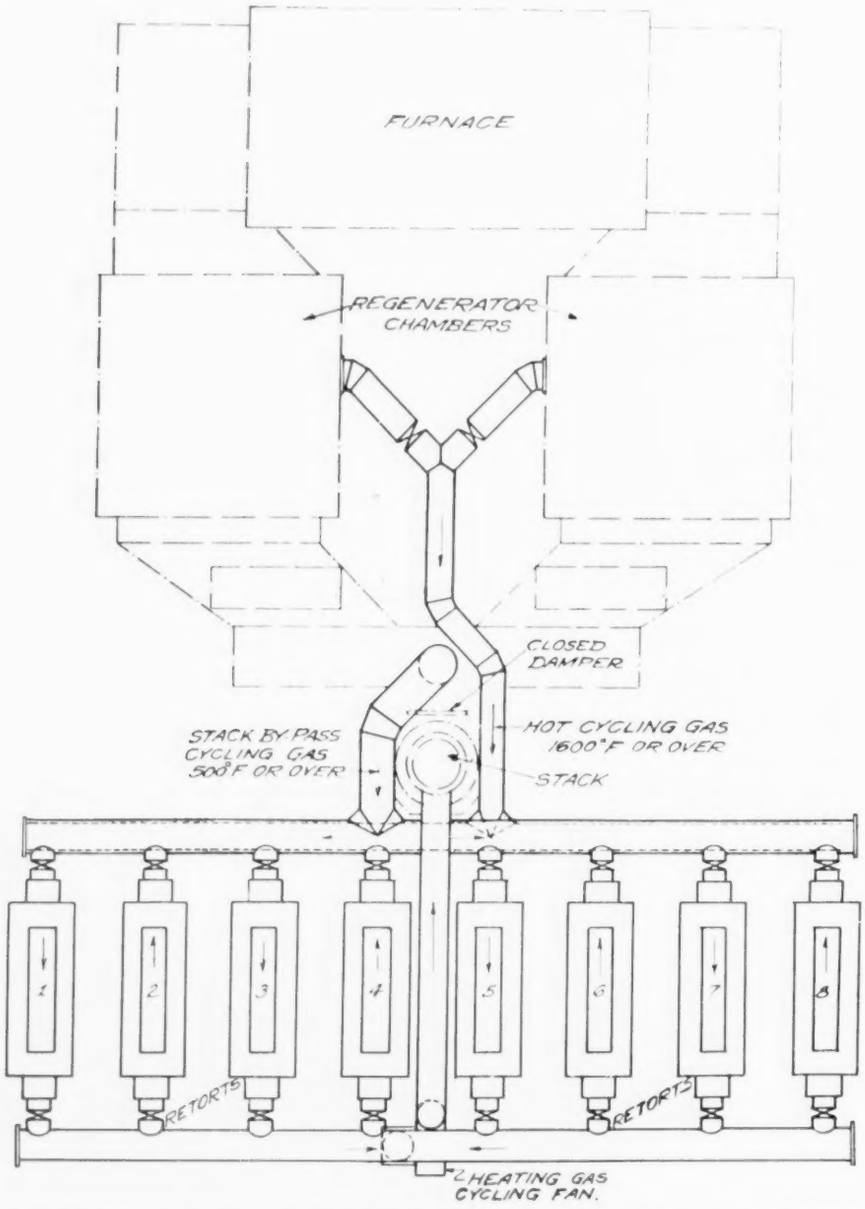
Alter Foundry Patterns by Gas Cutting and Welding

Old work patterns are being altered by welding to form new designs. In one case, an improvement in design of an ordinary cast iron bell and spigot pipe made it desirable for the company to change over completely to the new type. Because of the wide variety of sizes and types, such a change would have been exceptionally expensive. Because the hub and spigot for the Y-connection is the same as for

a T or X-connection, all that was necessary for the foundry to do was to make a new master pattern for each size hub and spigot and then cast enough work patterns from these to correct all the old foundry patterns. Using an oxyacetylene cutting blowpipe, the hubs and spigots from the old pattern were cut, and new ones bronze welded in place. The rebuilt patterns then were machined to their finished dimensions.

Proposes to Combine Wastes Disposal With Output of Valuable By-Products

BY USE of a specially designed retort or still, George B. Cramp, engineer, Denver, Colo. proposes to achieve the double result of solving Denver's wastes disposal problem and producing by-products to cover operating costs. This unit is intended for the distillation or disposal of sewage sludge, city garbage and rubbish; in it may also be distilled a mixture of bituminous coal and lignite to produce smokeless domestic fuel. His proposal was made recently in connection with a recommendation that the sewage treating plant whose construction now is being considered by the city of Denver be supplemented by an auxiliary wastes disposal plant. Acceptance of this proposal, it is said, would save approximately 20 per cent of the first cost of the sewage treating plant proper.



A suggested arrangement of eight stills hooked up with a regenerative furnace and operating on bituminous coal or any low grade fuel such as anthracite fines, lignite, peat, oil shale or wood wastes. It is recommended for use in industrial plants in place of existing gas producers

The units or stills comprising the distillation plant would be heated by cycling inert gases of combustion through heaters of the same type of design as the conventional, regenerative, hot blast stove as used at iron blast furnaces. The stills would be arranged in a battery and in a line parallel with the heaters or stoves.

Each of the stills would be raised successively from an initial low to higher temperature by cycling the heated inert gases from the stoves, first through the hottest and then through successively cooler stills. This would bring over first the water in clear uncontaminated form, followed by the light and heavy oils and by the rich and finally the lean gases. The residue or coke would be reduced to carbon monoxide gas within the retort or it would be cooled therein and discharged as smokeless domestic coke.

System Suitable for Industry

The type still recommended, says Mr. Cramp, may also be installed at industrial plants in place of existing gas producers. It could be coupled to any furnace operating at as low as 1600 degrees Fahr., and stack temperature of 500 degrees Fahr., thus utilizing waste heat for production of fuel gas at efficiencies 15 to 25 per cent higher than obtained with gas producers. The accompanying drawing illustrates a suggested arrangement of eight stills hooked up with a regenerative furnace and operating on bituminous coal or any low grade fuel such as anthracite fines, lignite, peat, oil shale or wood wastes.

For the Denver disposal plant Mr. Cramp proposes a battery of stills capable of distilling 390 tons of material each 24 hours. This would include 50 tons of sewage sludge from the projected sewage treating plant, 50 tons of garbage, 50 tons of rubbish, 100 tons of lignite and 140 tons of bituminous coal.

He estimates that the distillation of such a charge would require 955,000,000 B.t.u.'s each 24 hours, on the basis of a thermal efficiency of 80 per cent. He further figures that the distillation of the wastes with some leaner gases of lignite distillation would not only supply this heat requirement, but in addition a saleable surplus of 1,517,000 cubic feet of gas averaging 600 B.t.u.'s

per cubic foot would be produced.

In addition, the expected daily output from distillation of the bituminous coal and lignite would be 160 tons of smokeless domestic coke, 420 gallons of motor fuel of the character of benzol and toluol, 3600 gallons of fuel oil, lubricating oils phenols and paraffins and from distillation of wastes 25 gallons of alcohol, 150 gallons of fruit and vegetable oils, 100 pounds of fats and greases and about 40 tons of sewage, garbage and rubbish char—a good industrial filtering or absorbing medium—which could be reduced to 13 tons of ash of medium fertilizer value.

Mr. Cramp calculates that the daily output of these products as well as the saleable gas, would have a market value of $1625. The complete plant installed would cost an estimated $600,000 and with the daily operating cost estimated at $1053 the project would become self liquidated in three years.

Lamp Bulb Sockets Are Simplified

AN INTERESTING example of simplification in the design of products is reflected by the recent development of sockets for small lamp bulbs by the United-Carr Fastener Corp., Cambridge, Mass. These bulbs are used principally in the automobile and radio industries for illumination of instruments and dials. It is essential that the bulbs be held securely against loosening by vibration. They also must be easily replaceable.

To meet these conditions, this company has cut in half the number of parts usually required. The bulb is inserted by the familiar bayonet twist, after which the socket with the bulb in place is snapped into a round hole in the instrument panel or other sheet metal part to which it is to be attached. A series of spring fingers holds it in place with sufficient tension to insure that it will remain there until pulled out by hand.

Parts Are Made of Steel

The new snap socket, shown in the accompanying illustration, is an assembled unit consisting of two component parts, one of which is pronged while the other forms the body of the socket. Both are of steel. These two parts are made on eyelet machines while a ratchet dial press is used for assembling. After the two parts have been assembled, the snap socket is finished in cadmium.

Among the refinements on the new socket are its expanded rear section

Improved sockets for small lamp bulbs for illuminating instruments and dials are made of steel, in two parts, after which the assembly is cadmium finished

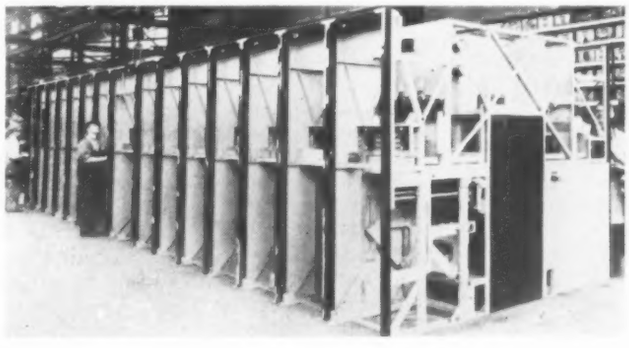
for giving the fingers a secure grip and a protective collar around the hole through which the wire enters. This collar prevents wear of the insulation and eliminates the need of a fiber washer in assembling. Patents on the new socket are pending.

Steel Increasingly Used In Switchgear Frames

The completed, 15 double-unit, 2300-volt, station service Metal-Clad switchgear, designed and manufactured by the Delta-Star Electric Co. of Chicago, for the Boulder Dam power house, illustrates the adaptability of steel to designers' ideas. The understructure or frame shown in the accompanying illustration is composed of standard rolled shapes oxographed to dimensions and welded into one integral unit with guide rails, interlock pads, bearing supports, etc.

The superstructure is built up of light angles cross-braced for strength somewhat in the manner of an airplane fusilage. The entire framework is sheathed with formed steel sheets. Strength is imperative, yet this switchgear is actually of the lighter type of construction, strength being achieved by the correct placement of tensile struts. Steel is being used in the manufacture of switchgear in increasing amounts, replacing concrete which previously was generally employed for supporting and reinforcing purposes.

After completion, the switchgear shown will control two 3000 kilovolt-ampere station service generators, one 3000 kilovolt-ampere station service transformer bank and all 2300-volt feeders supplying power to the power house and dam auxiliary equipment.



Welded steel frame for switchgear for Boulder dam power house reflects the tendency to replace concrete with steel in such structures

Will Present Lectures on Testing of Metals

As part of its educational activities, the Pittsburgh chapter of the American Society for Metals again offers a series of lectures which will be held at the United States bureau of mines auditorium, 4800 Forbes street, Pittsburgh. The program of lectures, which will deal with metals and their properties, follows:

Nov. 19—Metallographic Tests—Howard Scott
Nov. 26.—Grain Size Determination—Dr. F. H. Allison Jr.
Dec. 3—Hardness Testing—Dr. F. H. Allison Jr.
Dec. 10—Tool Steel Tests—Dr. F. H. Allison Jr.
Jan. 14—X-Ray Diffraction Tests—Dr. Maxwell Gensamer
Jan. 21—The Tensile Test—Dr. Maxwell Gensamer
Jan. 28—Fatigue Testing—R. L. Templin
Feb. 4—Impact Testing—Jerome Strauss
Feb. 11—Creep Testing—P. G. McVetty
Mar. 3—Mechanical Property Relations—Howard Scott
Mar. 10—Corrosion Resistance Tests—Dr. C. M. Johnson
Mar. 17—Electrical and Magnetic Tests—P. H. Brace

Blowers for Sewage Plant Are Improved in Design

Two large blowers incorporating several new and noteworthy features of design were developed recently by the Roots-Connersville Blower Corp., Connersville, Ind., for installation in an eastern municipal sewage disposal plant. These blowers, built on the rotary positive principle, present a streamlined appearance as a result of providing all pipe connections below the level of the floor. Built for top discharge, the ducts are carried down the side and integral with the cylinder casting.

Manual volume controls are built into these blowers, and provide a quick and simple means of varying the capacity of the units to

meet changes in plant requirements from day to day. Since power consumption is lowered with reductions in the volume and pressure, this control system is claimed to provide real economy.

Rotary Crossed Axes Gear Shaving Process Described

(*Concluded from Page 32*)

feather edge. The hollowed surface previously exhibited again is present. The portion not finished to the proper depth is the surface adjacent to each side of the band, which is ⅛-inch wider than the first band mentioned.

If we take a third sample and reciprocate the work by an amount equal to its face width or more the entire surface of the tooth will be finished to a uniform depth. The center blades of the cutter will now extend the above-mentioned ⅛-inch band of finished surface over the entire width of the tooth. Any desired tooth thickness can be obtained by additional feeds of the work toward the cutter.

When the desired tooth thickness has been obtained, additional idling strokes of the machine finish the face of the tooth to the same degree as a burnished surface.

Limitations on Shoulder Gears

A practical limitation on crossed axes shaving occurs with shoulder gears of different diameters and in close proximity. Lack of space between the individual gears obviously limits the angle at which the axes may be crossed. With a space between gears of ¼-inch and with differences in diameter of 1 inch, cutting can be accurately done. Each case in this catagory must be studied individually to determine the most practical axis angularity. This angle may be reduced to 5 degrees where necessary without jeopardizing the accuracy of tooth profile, although at as small an angle as 5 degrees it is found necessary to increase working pressure.

In shoulder gear work, it is not always possible to keep the cutter directly over the intersection of the axes due to lack of room. When that is the case, it is moved over so that its edge is over the intersection.

In summary, rotary crossed axes shaving offers a practical, economical means of correcting and finishing gear teeth to improve operating efficiency, to reduce gear noise and to lengthen gear life. It accomplishes these results without surface distortion, at production rates and at an unusually low tool cost. In short, it makes available in commercial gears the same quality standards that have applied only to such units as automobile transmissions.

WELDING, et cetera . . .

BY ROBERT E. KINKEAD

IN THIS column, the author, well-known consulting engineer in welding, is given wide latitude in presenting his views. They do not necessarily coincide with those of the editors of STEEL.

Brookings Report

THE path to salvation is in the direction of keeping wages up and prices down, according to Brookings institution findings. Its recent report ends with the rather surprising comment that, while this is the salvation of the country, no suggestions can be offered now as to how it may be accomplished.

General Electric Co. has accomplished this desirable end in the case of lamps; the automobile builders with trucks and passenger cars; many power companies have a record of keeping wages up and price of power steadily on the decline; domestic refrigerators are made better continually and sell for less, year after year.

If the Brookings institution does not know the answer, there are at least a hundred successful manufacturers and a thousand engineers who can inform them on the subject. The welding industry has had profitable experience doing the very thing Brookings recommends.

The answer lies in the use of science and technology to increase the productivity of man. It works. It is sociologically sound since, if we are all to have more things, we must all produce more with the same effort. The very thing that industrial America does best seems to have escaped the attention of Brookings investigators. The case for enlightened wage and price policy, which the institution recommends, is well authenticated and documented in financial circles.

While New Deal politicians may have missed the point, it is surprising that Brookings should miss the fact that the most successful institutions of American business are founded on the principle of high wages, low prices and high productivity per man.

Welded Pipe Withstands Shocks of Earthquakes

IN REPLY to telegraphic inquiry of the enterprising editorial department of STEEL, the Montana Power Co., Helena, Mont., reports as follows:

Earthquake tremors left our underground gas lines intact. Have 415 miles of arc welded transmission lines, of which 33 per cent is solid welded, 67 per cent is combination of couplings and welding; 423 miles of distribution and service lines all oxy-acetylene welded.

Vindication is thus given to many engineers of the water, oil and gas companies who have insisted that welded construction offers a safeguard against earthquakes and changing conditions of soil loading. The strength of the welded joint is always greater than the yield point of the pipe and usually greater than the ultimate strength of the pipe itself. The high speed of travel of earth tremors results in loading which may be classed as impact and if there were any doubts about the way welded pipe joints would withstand such loading, the experience of the Montana Power Co. is significant.

Steam locomotive builders watch with interest the move of a General Motors Corp. subsidiary in Chicago to haul heavy freight trains with 3600 horsepower diesel-electric locomotives. These locomotives are all welded together except where mechanical joints must be broken. The engine, the frame, the cab are welded rolled steel. The plant in which the locomotives are built was erected with structural steel, welded together. Cranes also are all-welded construction.

Why and When Is It Profitable To Invest in Modern Plant Machinery?

BY GEORGE H. JOHNSON
Vice President, Gisholt Machine Co., Madison, Wis.

A MAJOR problem confronting not only the actual purchaser but also the manufacturer and seller of capital equipment is to justify properly and adequately the purchase of new equipment. Admittedly, somewhat more than half of the existing machine tools are over ten years of age, and also, engineering practice has advanced so rapidly in machine tool design that greatly increased production is available from any new machine as compared with older models. However, in order either to justify the purchase or to make the seller's argument convincing, it is necessary to prove conclusively that a new machine will make itself an investment on which the return is so great that the user cannot afford not to buy.

Will the Buyer Profit?

A machine tool is not unlike a bond or a stock. Its purchase requires a capital expenditure and its purchaser expects an adequate income from the investment by means of increased profits from faster production and lessened overhead. It is the seller's problem to prove that the machine will return sufficient income to justify its acquisition, and it is the purchaser's opportunity to act after he is convinced that the possibility for income and profit does exist.

Theoretically, it should be easy to bring about the sale of a machine merely by means of guaranteed production estimates showing a definite profit on a given investment. Actually the problem is not so simple. Many different theories exist regarding depreciation, overhead and adequate investment return. It is necessary to work out a formula properly which will definitely tell when the resultant profit is sufficient to justify the machine's purchase. Many —probably too many—such formulas have been worked out, but as yet no consistent practice has been achieved.

Base Depreciation on Useful Value

Depreciation and the establishment of depreciation reserves are subjects too complex to attempt a discussion in such a short space. However, if depreciation reserves were usually maintained in cash, or the equivalent, in separated accounts, ready for reinvestment in capital assets, much of the question of available funds for equipment purchased would be solved. There are two extreme accounting views on depreciation. First, that of charging depreciation on the entire replacement cost value of the most modern equipment. Second, that of charging depreciation on the depreciated book value of the fixed assets. Both are probably open to criticism and a new approach to the problem is being used. Many accounting and financial experts are now proposing that depreciation be based on a useful value basis. This useful value is between book value and replacement value and is arrived at by a consideration not only of these two factors, but also of the productivity and general condition of the equipment.

In addition to the necessity of considering depreciation, the question of how to handle overhead savings in equipment purchases becomes of great importance. Many buyers of tools insist that all savings and return on investment be calculated solely on the basis of direct labor saved. This practice appears to be open to serious question. For example, if a company could start anew with a plant completely modern in every detail, it is obvious that overhead would be lowered. Better physical equipment would require less supervision, lowered heating costs, reduced inter-plant transportation, reduced maintenance work, etc. More accurate and durable machinery results in decreased inspection costs, fewer repair bills, and less jig and fixture expense. Finally, a greater productivity per man-hour means a larger number of saleable products produced per hour of fixed expense and a consequent reduction in both direct and indirect costs.

Conversely, if a company were caused to move into a plant that was hopelessly obsolete in all phases of its physical equipment, it follows that all phases of its overhead expense, excepting certain fixed charges, would be materially increased.

Somewhere between these two extremes lies the proper treatment of overhead savings caused by installation of modern equipment. It would appear logical that in computing the value of an hour saved that not only the direct labor but also a substantial portion of the hourly overhead charge should be included.

Lessened Return Is Justified

At present the interest returns on bonds and stocks are at the lowest level in many years. If confidence exists in the ability to continue to utilize the production from new equipment, probably a somewhat lessened return on industrial machinery investments can be justified. Of course, the expected return must be higher than that on the highest grade securities because of the greater business risks involved.

From data gathered from many hundreds of time estimates and equipment surveys for customers, it is apparent that the average yield on most types of modern machine tools, as contrasted to those built over ten years ago, will be between 15 and 25 per cent per annum. This result is calculated on an average basis utilizing depreciation, maintenance, and

tax differences and calculating savings both for direct labor and a substantial overhead charge per hour. There are many examples of much higher returns, some as high as several hundred per cent per annum, and fewer examples of lower returns. It seems apparent from these studies that the investment value of new capital equipment today is far greater than it has been for a long period of years.

There exist today two deterrents which are preventing more of such investment: First, the fear of not being able to keep such new equipment in continual use, due to possible business recession in the future; and second, difficulty in obtaining funds with which to make such purchases. It would seem that the risk involved in the first case is not much more than that involved in a security purchase, and the probable return is much greater. Improvement in the financial situation rapidly is solving the second difficulty, so that long term borrowing is again becoming feasible.

Considering carefully the financial and business outlook, there is a great deal of evidence today that the most attractive investment with the highest yield is the replacement of obsolete factory equipment with modern equipment. A highly satisfactory interest return is available, a more economical yet increased production is assured and the capital value of the equipment is not subject to violent fluctuation caused by financial manipulation. In this day of keen competition and the survival of the most efficient, lowered cost is the one best means of insuring survival, and modern equipment is one of the most important means of lowering cost.

Refinements in Control Apparatus Offer New Opportunities for Re-equipping

BY W. H. WILLIAMS
Vice President, Clark Controller Co., Cleveland

IN MODERNIZING so as to reduce the various cost items which are included in their manufacturing processes, steel producing and metalworking companies find electrical control units have been vastly improved in recent years. Many control installations made as recently as six or seven years ago are out of date today and can be replaced with new ones which will pay for the investment in a reasonable length of time. The improvement in magnetic contactors is such that, doing the same work, they cost much less to maintain than do the contactors of five years ago.

Recapturing Lost Minutes

Experience of contactor manufacturers clearly reveals that intelligent attention to the control of motors in electrical drives effects important reduction in costs. Recent developments in wide strip mill installations illustrate the value of modern, automatic control in connection with starting and stopping speeds. The loss of a minute here and there means much in the monthly output and the cost per ton with these high capacity units. With the use of modern control apparatus many of these lost minutes are eliminated, and the control apparatus pays for itself over and over again.

The same remarks apply to the development of automatic sheet catchers and their controls. With these units more sheets are produced per hour than ever before, so that the question of speed becomes of prime importance. It affects directly the man-hours and other items of cost entailed in producing a ton of sheets.

Rolls Are Set Automatically

Another important development is automatic screwdown control whereby the actual setting of the rolls is accomplished by what is known as the pre-set method. The instant the steel leaves the rolls after one reduction, the operator pushes a button with the result that at the end of the pass the rolls automatically move to proper position for the next pass. Thus the development of control apparatus makes it possible to adjust rolls automatically and much faster than is possible when using the master switch and indicating pointer which the roller has to watch. Here again is an achievement which enables the steel producers to improve their efficiency and reduce their costs.

In the past few months a real improvement has been used in the control of the hoist motor on an alternating-current, overhead traveling crane. By this improvement the operation of the alternating-current crane hoist can be made to closely approach the characteristics of the well established, direct-current dynamic lowering crane hoist. By the new arrangement it becomes possible to make a great improvement in the operation of many old cranes.

Safety is receiving more and more attention in the manufacturing industries, not only because of human interest and sympathy, but because the laws of the various states make it expensive for the manufacturer to allow his employes to be injured.

Of importance, therefore, is the fact that control of power presses in automotive and other metalworking plants has improved by leaps and bounds in the past two years. Control apparatus has been provided which prevents accidents that have occurred when operators got their hands or arms between the dies when the press is operating. It now is necessary for the operator to keep his hands on the controlling buttons and entirely away from the danger zone of the press. Means also have been developed for automatically stopping the press should a ground in the circuit occur. An important "non-repeat" feature has been developed. It is needless to detail the benefits that are derived by the manufacturer who equips his production units with such control.

Quick Stop Aids Safety

Another recent contribution to safety in manufacturing operations is the development of a control which has cut down materially the time required to stop a large rubber calender mill drive. This has been accomplished by incorporating a new idea in the combination of either a synchronous or wound rotor type motor and modern control. Ths calender press is equipped with a safety cord so that if the operator's hand gets caught in the rolls the pull on the rope will stop the motor. Prior to the new control, it was difficult to comply fully with the state law which required that the actual linear travel of the surface of the roll, following a pull on the rope, be limited to a certain distance. By the new idea the linear travel is limited to well within the requirement. Chances for serious accidents are reduced correspondingly.

Newly developed controls make it possible to perform by a combination of motor and control many operations previously accomplished hydraulically or with compressed air. In many cases the new method is more efficient. In particular it prevents delays which result with hy-

(Concluded on next page)

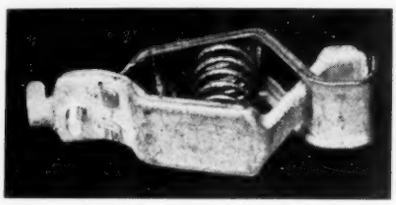
LARGE USES OF STEEL IN SMALL WAYS

298th Article ◆ Battery Clips

BATTERY clips came into existence about 1908. At first they were used largely in electrical test work. A few years later they began to be used in large volume in charging automobile storage batteries. Still later the development of radio opened new outlets for clips. Today they are manufactured in large quantities and are used in making connections in many industries.

A typical clip made by one of the leading manufacturers of such units is shown in the accompanying illustration. Such clips are produced in a wide range of sizes, weighing from 0.01 to 0.35-pound each. Their use is so widespread that though the weight per piece is insignificant the total is important. One manufacturer alone is taking in some 40 to 50 tons of steel annually for this application.

The patented clip shown is made in two pieces, one with ears and the other with slots into which the ears on the accompanying piece fit. A coiled spring is placed between them and the assembly completed by squeezing the two halves together and bending the ears so they lock in the slots. They are finished by adding a screw for use in making wire connections. Clips are formed from flat steel 0.02 to 0.05-inch thick. Coiled springs are made of 0.018 to 0.067-inch diameter, spring wire. The screws also are made from steel wire.



—*Mueller Electric Co., Cleveland*

Battery clips, illustrated herewith, are widely used for battery and electrical connections. They are of steel and made in sizes weighing 0.01 to 0.35-pound each

Chief requirements in the manufacturing process are production on a volume basis, with maintenance of requisite quality. The principal mechanical units at the plant of the manufacturer of the clip shown are seven punch presses, a spring coiling machine and six semiautomatic tapping and screw machines.

After the forming operations, all parts are sent to the plating and dipping department where they are lead plated or dipped in hot lead so as to give not only atmospheric resistance but also protection against sulphuric acid used in batteries. These finishes also give good appearance. The parts then are assembled and locked in special jigs. After inspection they finally are packed 10 in a carton for shipment.

Less-than-Carlot Shipping Containers Gaining Favor

(*Concluded from Page* 35)

crosswise or lengthwise of the car; however, they can be removed by crane if delivery of the load intact to a destination off the railroad is desired. The air activated tanks shown in an illustration on page 35 were fabricated by International Boiler Co., Stroudsburg, Pa.

Incidentally, the cement is loaded into containers through the top from an ordinary cement bin, but can be loaded by gravity as well. Each container has a maximum capacity of 10 tons, but less is usually carried in allowing amply for necessary settling space and the free air for extruding. The average time for discharge through the outlet pipe is not in excess of 10 minutes and in some cases the time for discharging has been no more than eight minutes. A hopper shaped bottom of proper angle is welded into the cylindrical shell to facilitate discharge.

Another recent development is an all-steel container for handling tiered brick as it comes from the kilns, 1500 brick to the container. These containers are made of 12-gage open-hearth steel and run 22 containers to a car of 33,000 brick capacity. This type of container is shown in one of the illustrations on page 35 and is also a product of the L. C. L. Corp. This method of shipping brick, it is pointed out, offers the advantages of having brick continuously handled and transported in stacked formation at low cost and with a minimum of chipping or breaking.

The work now being done with stainless-clad steel is on containers of the air activated type similar to those used for handling cement and other powdered materials. Stainless-clad steel is being used in this case to avoid any possible contamination of the stored material. Flour, particularly, it is pointed out, would appear to lend itself to this type of handling due to the large increase in the per car handling as compared with bag flour and the primary economy of getting such materials in bulk rather than in bags which are scrapped or returned for credit.

To Hear Five Lectures on Corrosion of Metals

Five lectures, each presented by a different lecturer, comprise the first of this season's educational courses arranged by the Cleveland chapter of the American Society for Metals and held at Case School of Applied Science, Cleveland. The courses were inaugurated in 1932.

Approximately 200 have registered to attend the lectures, the first of which was given the evening of Oct. 21 by Dr. Carl F. Prutton, head of chemistry department, Case School of Applied Science, dealing with general principles of metal corrosion. Other lecturers include V. V. Kendall, National Tube Co.; F. L. LaQue, International Nickel Co. Inc.; N. W. Mitchell, Chase Brass & Copper Co.; and Dr. F. E. Carter, Baker & Co. Inc. The four succeeding lectures will be held Oct. 28, Nov. 11, 18 and 25.

Forum on Modernization

(*Concluded from Page* 42)

draulic units when operating in extremely cold temperatures.

Modernization does not mean necessarily the throwing out of old motor driven machines. If the machines themselves are efficient and cannot be replaced to advantage they may be helped greatly in many cases by installing modern control. Any manufacturer will do well to investigate the possibilities.

To builders of all sorts of motor driven equipment the recent improvements in control are of even greater significance, since the success and prosperity of these manufacturers depend on building machines that will satisfy customers. The average customer will not long be satisfied with a machine whose control is not up-to-date.

All indications point to increasing business in 1936. Now is the time to prepare for your share of this business. Look over your equipment and study the possibilities for reducing costs. Realize the benefit of the latest ideas of equipment builders.

Accident Compensation Must Not Involve Social Reforms

COMPENSATION paid to workmen for industrial accidents must not be stretched to include sickness insurance, unemployment insurance and old age pensions, for fear that the whole system break down, was the warning given by John E. Long, president of the National Safety council, in presenting the keynote address at the twenty-fourth annual safety congress in Louisville, Ky., Oct. 14-18.

"In the industrial field we find the problem of occupational disease overshadowing many of our other problems," said Mr. Long. "I am sure we would be happy if we could confine our activities to the humane work of prevention, but safety work cannot always be divorced from the complicated results of disability. So we find ourselves at times confronted with medico-legal situations. The safety movement has no sympathy with any effort to reduce accident costs by the avoidance of just claims but our whole system of compensation is complicated by some very human traits. Compensation, particularly in the field of occupational diseases where the responsibility is often vague, sometimes degenerates into a form of relief.

"Industry must assume the responsibility for freeing its work places from sickness and accident hazards, but the employer has a right to be assured that he is not paying for a disability acquired elsewhere. I am convinced that public opinion will demand higher standards of industrial hygiene just as it began to demand safer factories and safer transportation 25 years ago.

System Would Break Down

"Our knowledge of industrial health hazards is still extremely meager. It must be augmented considerably in the interests of both the employer and the employe. Compensation cannot be stretched to include sickness insurance, unemployment insurance and old age pensions without danger of the whole system breaking down. Other plans must be made for these social measures," declared Mr. Long.

Detection and prevention of tuberculosis in industry are among the most important functions of the industrial physician from the standpoint of legal liability and production efficiency, as well as humanitarian interest, said Dr. C. S. Gallaher, medical department, Eastman Kodak Co., Rochester, N. Y., in addressing a session on industrial nursing. Tuberculosis is found frequently among industrial employes, he said. The Eastman company has applied preventative and remedial measures with the result that incidence of the disease and mortality rates have been decreasing steadily.

Analysis of 100 cases of tuberculosis conducted by the organization showed the cost of an average case to be more than $4000 with the possibility of a case costing as much as $24,000. These figures represent the expense both to the worker and the industry through lost wages, sick benefits paid, cost of medical care and loss of working time.

It has been found, according to Dr. Gallaher, that the only safe way to determine whether tuberculosis is present is to use a chest X-ray. In the case of an applicant for a position is found to have active tuberculosis, he is rejected. In the case of an old employe the workman may be shifted to a lighter type of work or to a type which will not aggravate the disease.

Protection Against Suits

In view of the many suits now being brought against industry for silicosis and related diseases it is of great value from a legal standpoint to know definitely the physical condition of every worker, and particularly the condition of the lungs when the man is hired, declared Dr. Gallaher. The subsequent periodic examinations are also valuable in that they may determine if, when, or how a worker has contracted pulmonary disease. Thus, in case a worker has a legitimate claim against an industry, the matter can be settled in a manner which will be fair both to the employe and the management.

Health work in industry is vaccination against industrial accidents, asserted Ethel P. Schilling, industrial nurse, Domestic Coke Corp., Fairmont, W. Va. The prevention of accidents, which is now a recognized necessity, is dependent more upon the physical and mental examination and the placement of employes than upon mechanical safeguards, shop discipline and safety crusades.

Pointing out that industry has paid an enormous bill for injuries aggravated by the original condition of the employe's health, Miss Schilling said that the health service of an industry should be just as well coordinated as the manufacturing process, beginning with a thorough physical examination.

The cost of industrial health work is approximately $6 a year for every position, the speaker stated. Some plants, with part-time medical service, have a per capita cost as low as $2.47, while a few, with full-time medical service and a most completely equipped industrial hospital expend as much as $22 a year on every employe. The cash dividend reflected in such an expenditure is realized in the reduction of time lost through sickness, decreased accident compensation, increased output, reduced labor turnover, improved efficiency and employe good will.

Discussing the question of how large a plant should be before health service is established, Miss Schilling said:

"The number of employes is no criterion for the justification of a plant physician or nurse. Health and safety work are important in all plants, regardless of the number of employes. It is just as absurd for a management with a few electric motors and elevators to say they do not need inspection as to say that the employer with a few employes does not need a health service."

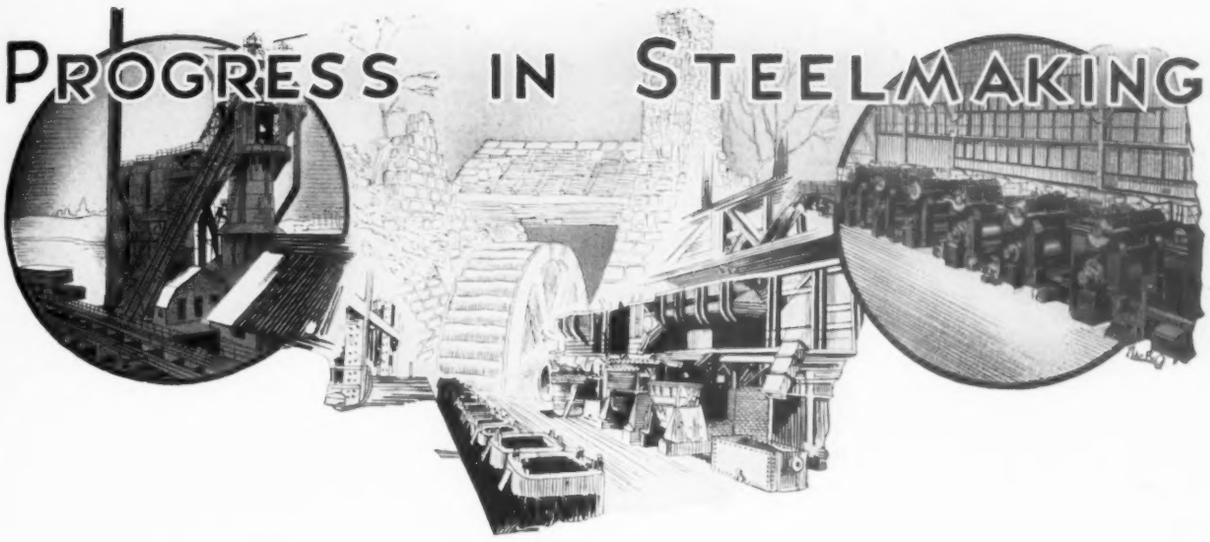
Sections Name New Officers

Various sections of the National Safety council elected officers during the Louisville congress. The new officers for the metals section are as follows: General chairman, H. W. Darr, Bethlehem Steel Co., Johnstown, Pa.; vice chairman, A. Berquist, Youngstown Sheet & Tube Co., East Chicago, Ind.; vice chairman, C. M. Allen, American Rolling Mill Co., Middletown, O.; vice chairman in charge of health, Dr. R. C. Engel, Corrigan-McKinney division, Republic Steel Corp., Cleveland; and secretary and news letter editor, R. A. Chaffin, Continental Steel Corp., Kokomo, Ind.

New Officers of the power press section are as follows: General chairman, E. J. Wallman, Great Lakes Forge Co., Chicago; vice chairman, P. G. Hunter, Motor Wheel Corp., Lansing, Mich; vice chairman in charge of membership, B. E. Rockhoff, Detroit Steel Products Co., Detroit; secretary, E. W. Meeks, Transue & Williams Steel Forging Corp., Alliance, O.; and news letter editor, R. M. Zelder, Edison General Electric Appliance Co., Chicago.

The automotive and machine shop section announced its new officers as follows: General chairman, C. T. Winegar, Chrysler Corp., Detroit; vice chairman, Marvin Heidt, Budd Wheel Co., Detroit; secretary, M. A. Clark, U. S. Rubber Products Inc., Detroit; and news letter editor, W. H. Frater, Cadillac Motor Car Co., Detroit.

PROGRESS IN STEELMAKING



New Device Assorts Sheets

Classifying sheets and tin plate made from continuous strip steel now is accomplished by a new process and equipment. The strip is unpiled, flattened, trimmed, accurately gaged, cut to length and automatically sorted into piles of light, medium and heavy gages, at the rate of about 250 feet a minute. Sheets can be classified within narrow limits, but it has been found that the tolerance from standard gage of plus or minus 0.0005-inch constitutes good practice and will come within rigid specifications of the consumer. A novel feature of the process is the stagger piler. This device accurately counts and records the number of prime sheets produced, in addition to stagger piling packs containing a predetermined number of sheets.

• • •

Improves Ingot Mold Life

In Sweden a practice has been developed which definitely has resulted in an improvement of the mold life and in the quality of the ingot as well. After pouring the ingot is pushed upwards in the mold as soon as it has congealed sufficiently to be moved. The ingot is rotated a quarter turn and then lowered so that its corners re-engage with the sides of the mold. The ingot is allowed to remain in this position until ready for the soaking pits.

• • •

Involves Close Inspection

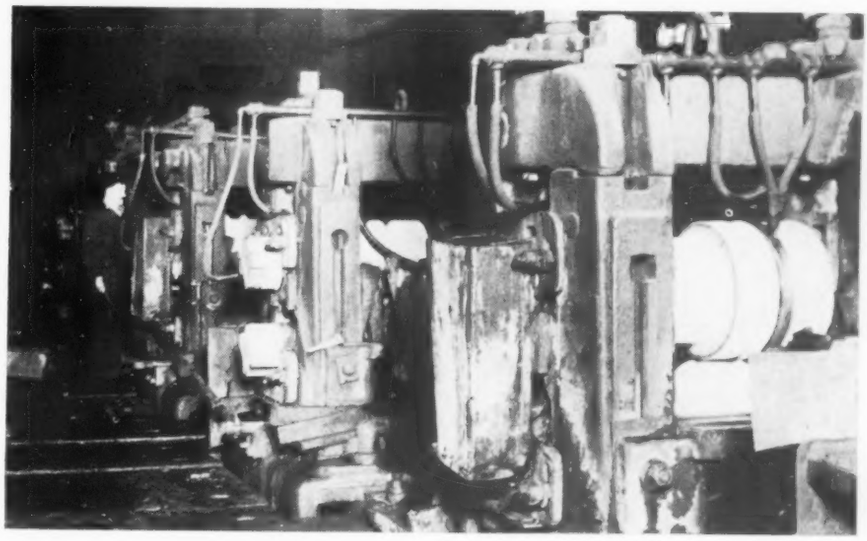
The condition and maintenance of cranes used in iron and steel plants depend to a large extent on the condition and maintenance of runways according to the records of the maintenance department of a Pittsburgh district steel plant. Tapered tread wheels on cranes will correct runway difficulties to a certain extent but their use is not a cure-all.

• • •

Heater Covers Wide Area

Stress relieving of nozzle and seam welds in high-pressure piping now can be accomplished by a recently developed electric heater which is built in two sections for clamping around the weld area. Each section has nickel-chromium elements set in refractory plates. The latter are surrounded by insulating material encased in steel sheets. The temperature of the weld is raised slowly to 1200 degrees Fahr. in a certain time period depending upon the thickness of the pipe and the capacity of the heater. The area of the heaters is such that the heat is supplied to a wide area above and below the weld.

Laminated Bearings Afford Operating Economy



POWER SAVINGS RANGE FROM 20 TO 40 PER CENT—Bearings of this type are made by molding under high pressure and heat layers of fabric which has been impregnated with a hardened resinoid. Under this action the material becomes a dense infusible structure. The purpose of the fabric is to impart the necessary continuity of fiber structure; resin serves as a bonding medium. About 7 per cent graphite frequently is incorporated in molded bearings to provide a smoother wearing surface and the utmost in power saving. Rolling practice has shown substantial savings in the cost of operating many type mills through the application of laminated bearings at rubbing speeds of 100 feet a minute or more. A 11½-inch bar mill equipped with composition bearings manufactured by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., is shown above

IMPROVING OPEN-HEARTH FURNACE DESIGN

by William C. Buell Jr.

Chapter X — Part I

Heat Exchange in Regenerators

ANY theoretical analyses of regenerators involves the inclusion of the three coefficients, first, that of the heat transfer of the hotter furnace gas to the cooler checkerwork; second, that of the recuperative and regenerative properties of the checker brick; and third, that of the heat transfer from the hotter checkerwork to the cooler air.

The purely technical consideration of heat exchange effects in regenerators are complicated, first by the many variables and changing factors inherent to operation; second, by the lack of definite knowledge as to the physical qualities of refractories under the conditions surrounding open-hearth regenerator action, especially as to average values over the campaign; and third, by the deficiency of specific data as to the transfer of heat at regenerator temperatures to or from the fluids of operation.

Data Are Available

A considerable amount of literature has been offered anent heat exchange effects in regenerators, the majority being of European origin and invariably dealing with the problem qualitatively or abstractly. Those who have examined such literature critically and have endeavored to apply the principles expounded are aware of, first, the difficulty of reconciling calculation to actual results, even when but a single coefficient is involved; and second, the utter impossibility of reconciliation when the three coefficients are used simultaneously.

The greatest progress in furnace design and operation will accrue if operators and their technical staffs

Table CXXXV

Thermal Balances—Downtakes, Slag Pockets and Regenerators

Values Based on Production of 1 Gross Ton of Ingots
(A continuation of Table LXII)

Fuel Practice Primary Fuel—B.t.u.	Line	Producer Gas—5,000,000 — Air System — Temp. deg. F.	Per cent*	B.t.u.	Producer Gas—5,000,000 — Gas System — Temp. deg. F.	Per cent*	B.t.u.	Fixed—4,000,000 — Temp. deg. F.	Per cent*	B.t.u.
Heat entering downtakes line n, Table LXII	a	3000	30.9	2,997,400	3000	20.6	1,998,200	3000	42.5	3,025,000
Heat entering regenerators	b	2825	28.9	2,805,000	2850	19.4	1,882,400	2850	40.2	2,860,000
Heat left in downtakes, slag pockets and fantails	c	175	2.0	192,400	150	1.2	115,800	150	2.3	165,000
Heat in air at A_6 or gas at A_5	d	2050	17.1	1,665,000	2175	16.8	1,629,000	2200	23.2	1,650,000
Heat in air or gas at regenerator exit A_{11}	e	1950	16.4	1,592,800	2100	16.4	1,592,800	2100	22.0	1,567,500
Gain in heat in fantails, slag pockets and uptakes	f	100	0.7	72,200	75	0.4	36,200	100	1.15	82,500
Radiation loss in downtakes, slag pockets and fantails	g	.....	1.3	120,200	.....	0.8	79,600	.....	1.15	82,500
To balance	h	.....	2.0	192,400	.....	1.2	115,800	.....	2.3	165,000
Heat entering regenerators at A_{11}	i	2825	28.9	2,805,000	2850	19.4	1,882,400	2850	40.2	2,860,000
Heat leaving regenerators at A_{12}	j	1250	12.7	1,172,800	1250	8.0	781,900	1100	13.9	990,000
Heat left in regenerator	k	1575	16.2	1,633,200	1600	11.4	1,100,500	1750	26.3	1,870,000
Heat in air or gas at A_{11}	l	1950	16.4	1,592,800	2100	16.4	1,592,800	2100	22.0	1,567,500
Heat in air or gas at A_{12}	m	500	4.1	398,200	1250	9.7	941,200	600	5.8	412,500
Gain in heat in regenerator	n	1450	12.3	1,194,600	850	6.7	651,600	1500	16.2	1,155,000
Radiation loss in regenerator	o	.....	3.9	438,600	.....	4.7	448,900	.....	9.9	715,000
To balance	p	.....	16.2	1,633,200	.....	11.4	1,100,500	.....	26.3	1,870,000

*Per cent of total heat developed in furnace—for 100 per cent fixed fuel firing, 7,112,300 B.t.u.; for 100 per cent producer gas firing, 9,709,800 B.t.u.

will adopt and generally apply the simple quantitative method just described with its single overall coefficient, until such time as scientists, through further researches, may be able to offer more adaptable values, and through the use of which the complicated qualitative method can be shown as of greater accuracy and economic value than the simple quantitative method.

Thermal balances of the proposed furnaces, one fired with fuel oil and the other producer gas, but calculated only for that part of the system above the charging floor (upper furnace), are given in Volume II, Table LXII, to be published later. These are used in the development of the furnace lines. A continuation of these balances to apply to the ancillary systems are presented in Table CXXXV.

The heat of the process, representing 100 per cent input and against which the percentages shown are computed, consists of the calorific heat of the primary fuel, which must be metered, or in the case of producer gas calculated; the sensible heat in the air and producer gas at the furnace throat, a product of the present balance, line d; and the sensible heat in the liquid iron of the hot metal charge and the heat of oxidation of the charge, both of which may be easily developed by the usual text book methods.

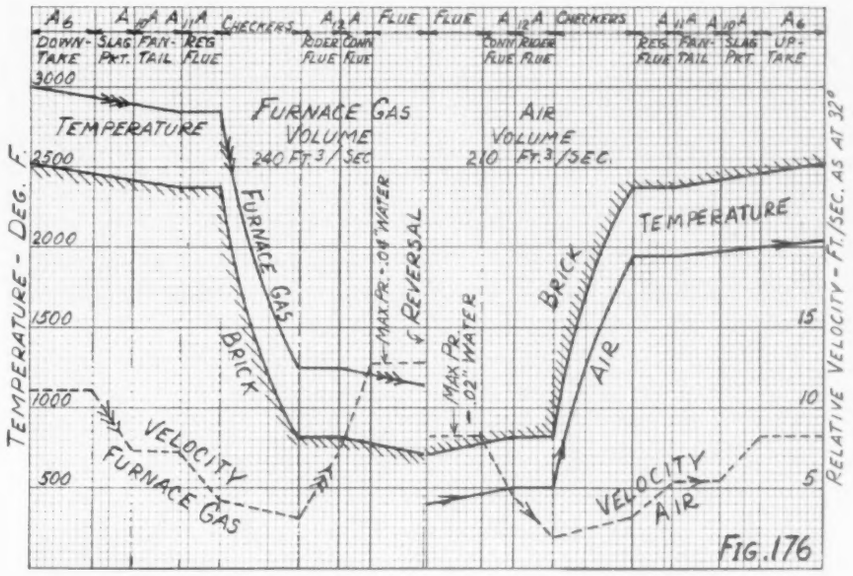
Results Are Charted

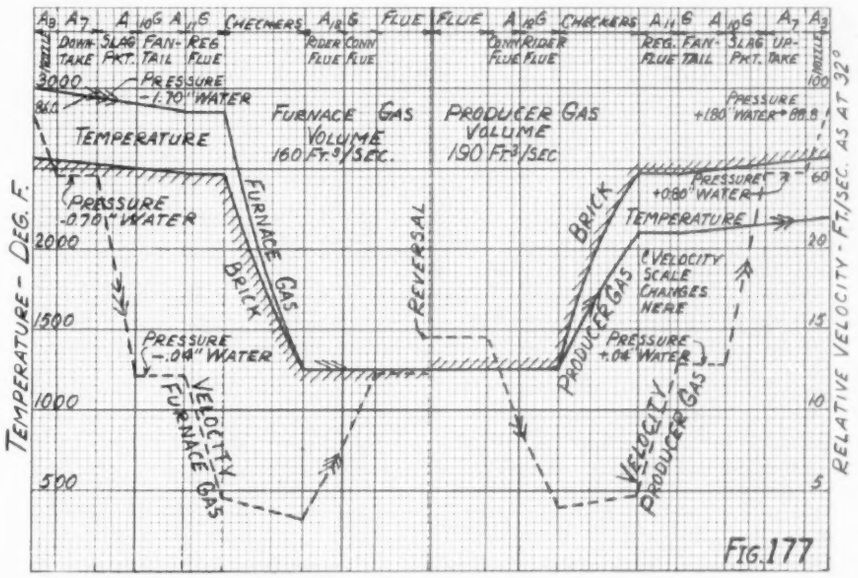
The balance of Table CXXXV may be computed then with a knowledge of the fuel composition from which the appropriate thermal capacity chart may be constructed in accordance with previously described methods; the rate of fuel firing and Orsat readings to allow the determination of combustion quality; and readings of fluid temperatures at the throats, regenerator entrances and exits.

In addition, in order to develop the overall transfer coefficient of the system, knowledge must be available as to the area of the transfer and surfaces. Much analytical information of great value in attempted betterment of design, construction and operation and check data as to the actual value of attempted betterment may be gleaned from such figures. The latter are the sole basis upon which it is possible to definitely analyze results.

The fuel oil (fixed fuel) balance will be used to demonstrate the solution of certain data.

With oil containing 149,950 B.t.u. per gallon, Fig. 173, the fuel consumption will be 4,000,000 ÷ 149,950 or about 27.5 gallons per ton of ingots. Thus, with the effluent gases leaving the furnace at 3000 degrees Fahr., line a, Table CXXXV, the heat passing will be 110,000 B.t.u. per gallon of oil fired, Fig. 173, or 3,025,000 B.t.u. total. The air entering the furnace at a temperature of 2200 degrees Fahr. line d, will con-





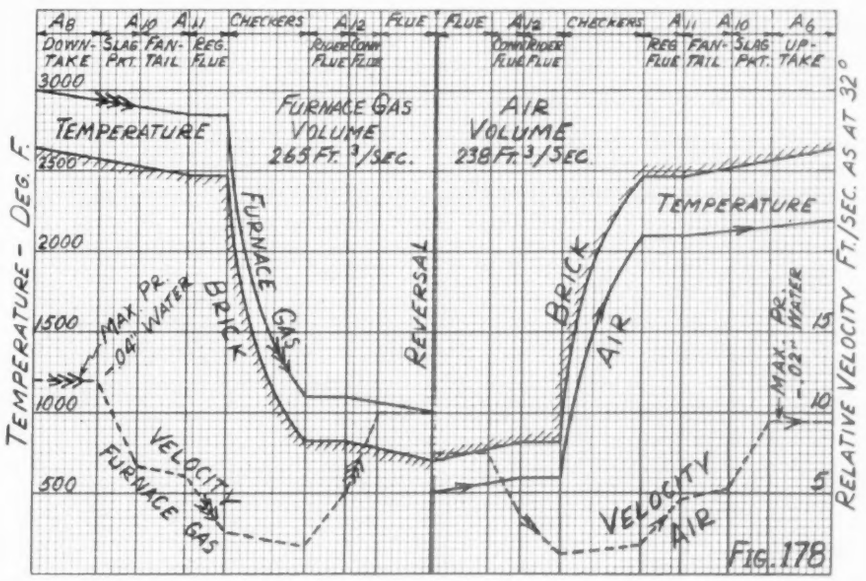


Fig. 176—Temperature chart of air system of proposed producer gas fired furnace and velocities of fluids. Heating cycle at left, cooling cycle at right
Fig. 177—Temperature chart of gas system of proposed producer gas fired furnace. Note high velocity and complementary pressure of furnaces gases at extreme right
Fig. 178—Temperature chart of the regenerative system of proposed fixed fuel fired furnace. Note nominal velocity and pressure conditions

tain 60,000 B.t.u. per gallon, or 1,650,000 B.t.u. total. This serves to show the method by which, in conjunction with the information of the preceding chapter, the balances are developed.

Given the data as to temperature and combustion quality which enters the problem as previously explained, the efficiency of any component of the ancillary system may be read direct from the thermal capacity charts without reference to fuel quantity, thus:

The effluent furnace gas at 3000 degrees Fahr. contains 110,000 B.t.u. per gallon. The air entering the regenerator at 600 degrees, line m, Table CXXXV, contains 17,000 B.t.u. and at the furnace, if at 2200 degrees, contains 60,000 B.t.u., a gain in thermal content in the system of 43,000 B.t.u. The apparent thermal efficiency of the entire regenerative system is accordingly 43,000 ÷ 110,000 or 39 per cent.

This is the basis upon which the thermal efficiency generally is quoted, and is erroneous.

How Efficiency Is Calculated

If the air was heated to 3000 degrees Fahr., the same temperature as the effluent furnace gas, the thermal efficiency of the regenerative system would be 100 per cent if the second thermodynamic law is valid. If the air be heated to 3000 degrees Fahr. it would contain but 82,000 B.t.u. as against the 110,000 B.t.u. of the furnace gas. Accordingly the true thermal efficiency of the regenerative systems is 43,000 ÷ 82,000 or 52.4 per cent instead of the 39 per cent apparent efficiency as previously cited.

The development of the overall transfer coefficient, which includes the term of one hour of time in addition to the data of the balance figures of Table CXXXV, requires information as to the production of the furnace in tons per hour, the area of the transfer surface other than that of the checkerwork and the transfer area of the checkerwork.

The production of the proposed oil fired furnace is given in Table CXXV as 14.75 tons per hour, and the exchange areas in the ancillary system other than the checkerwork as 6555 square feet, Table CXXVI, and of the checkerwork, Table CXXV as 30,160 square feet.

As herein set up the several or overall heat transfer coefficient may be found through the solution of the general equation:

$$K = \frac{P \times 2H}{MTD \times A} \quad \text{.....(54)}$$

In the above:

K = B.t.u./ft.²/hr./° temp. diff.
P = Production, tons per hour
H = Heat, B.t.u. received by air
MTD = Mean temperature differential, degrees
A = Area of heat exchange surface of 1 regenerator, square feet.

When developing heat exchange coefficients the question arises as to the proper value of the heat quantities to include in the equation. In the fixed fuel balance of Table CXXXV the following appear: Heat left in regenerators (by the furnace gases), line k, 1,870,000 B.t.u. and gain in heat in regenerator (by the air) line n, 1,155,000 B.t.u. Obviously, if the apparatus is in thermal equilibrium the furnace gases will give up to the checkerwork only such a heat quantity as will be absorbed by the counterflowing air. Therefore, the total heat quantity to enter the equation for the development of any transfer coefficient should be the heat shown as having been absorbed by the air while passing through the regenerators.

On the same grounds and if it is desired to develop a coefficient to include the entire system between A_{12} and the furnace throat, the quantity of heat upon which the coefficient should be computed is heat in air at A_6, line c, 1,650,000 B.t.u. minus heat in air at A_{12}, line m, 412,500 B.t.u. or 1,247,500 B.t.u.

Should it be desired to find the transfer coefficient for either the furnace gas or air alone only the unit value of H is included in the equation.

The mean temperature differential is the difference between the average temperatures of the hotter or emitting substance, furnace gas or brick transfer surface, and the cooler or receiving substance, brick transfer surface or air.

Temperature Is Determined

The average temperature of the furnace gas, brick transfer surface or air is the hyperbolic logarithmic mean of the extremes of temperature within the limits of the furnace system under consideration thus:

$$\text{Average temperature} = \frac{t_1 - t_2}{\text{Log}_e \frac{t_1}{t_2}} \quad (55)$$

in which:

t_1 = The fluid or brick at its higher temperature
t_2 = The fluid or brick at its lower temperature.

Temperature conditions within the regenerative system may be better visualized by the charts. Fig. 176 is of the air system of the proposed producer gas furnace, Fig. 177 of the gas system of the same furnace, and Fig. 178 of the combined regenerative system of the proposed fixed fuel fired furnace. The furnace gas and producer gas temperatures are from the balances of Table CXXXV. The brick temperatures have been calculated as the mean of the different fluid temperatures at the same points. The velocities as charted have been developed in the previous discussion. The pressures as noted are the complimentary values of velocity as read from Fig. 46 presented in the May 22, 1933 issue of STEEL.

The charts are developed for one complete cycle of the regenerators at *one side* of the system. The curves at the left of the charts are for operation "on" furnace gas and at the right "on" air and about a furnace reversal at the center.

As previously mentioned three sets of coefficients K may be calculated through the application of equation (54) as:

1. Coefficient of transfer from the furnace gas to the brickwork.
2. Coefficient of transfer from the brickwork to the air or producer gas.
3. Coefficient of transfer from the furnace gas to the air and/or the producer gas as a single operation and developing the overall coefficient.

While the accuracy of the coefficients of 1 and 2 may be questioned from our lack of knowledge of the physical action of the brickwork the overall coefficient will be subject to much less criticism if carefully developed, for here we deal in easily and accurately measured volumes and temperatures of fluids whose properties are generally well known.

The various coefficients of heat transfer for the proposed furnaces have been calculated as described and are listed in Table CXXXVI.

Reversal Alters Value

The first two coefficients in each block, columns e and g, the heat transfer furnace gas to the checker brick and from the checker brick to the air actually develop the coefficient given for but one-half of the operating time due to reversal. Therefore, based on the actual hourly transfer of heat these values are but one-half of those as shown, and their sum would equal the overall coefficient, the third item transfer of furnace gas to air.

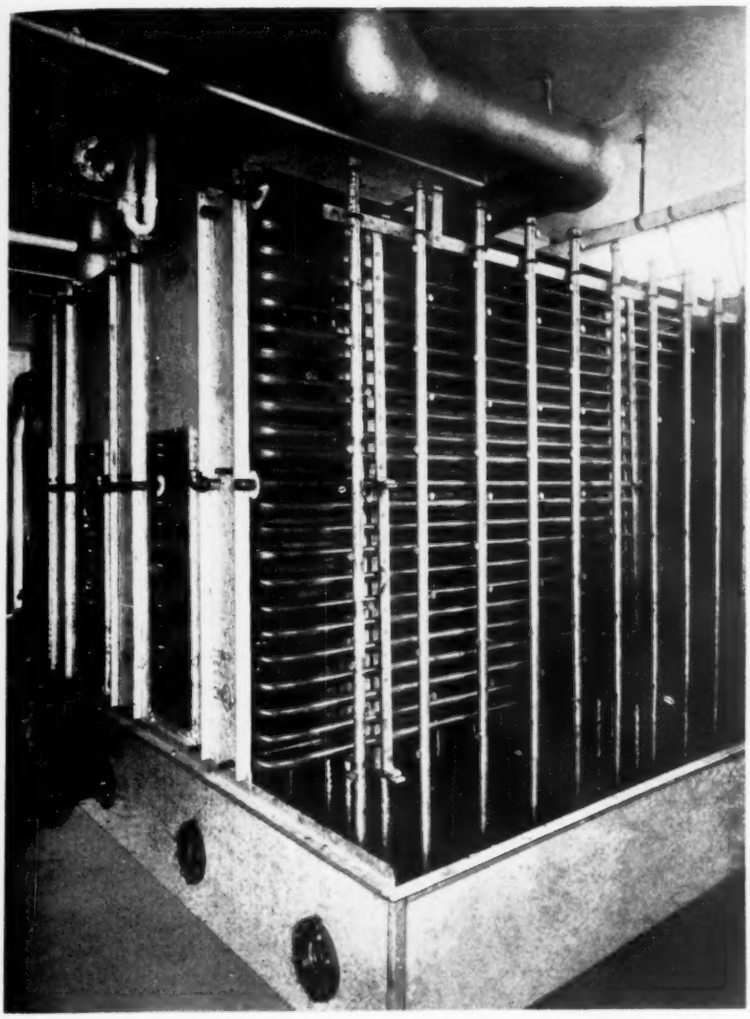
In view of the fact that the actual quantity of heat received by the air is the quantity to enter the equation in developing any of the three coefficients, the difference in the values is, therefore, only a function of temperature difference.

As the increase of the air temperature is invariably less than the loss of temperature in the furnace gas, it follows that the coefficient of the heat transfer, checker brick to air, must be greater than the coefficient of the exchange, furnace

Correction

The example for developing the heat balance of regenerators presented on page 56 of the Oct. 14 issue should have followed the second paragraph on page 57 of the Oct. 21 issue.

Based on past performance
TONCAN IRON
is again specified for Air Washer . . .



Five years ago, a large drug manufacturer installed an ammonia evaporator in an air washer. The material selected for both pipe and sheets was Toncan Iron. Recently, a similar installation was needed in the same plant. The performance of Toncan Iron during the last five years caused it to be specified for the new unit.

Service conditions such as are encountered in an installation of this sort are severe—air and moisture combine forces to tear down the ferrous structure. But Toncan Iron is not an ordinary metal. Refined open hearth iron, copper and molybdenum are here combined to form an alloy that possesses the highest rust-resistance of any ferrous metal in its price class. It often takes years for users to find out how superior Toncan Iron really is—how much more economical it is in service.

You'll find the story of Toncan Iron in "The Path to Permanence," if you're interested in sheets, and in "Pipe for Permanence," if pipe troubles worry you. Either, or both books, sent on request.

Republic Steel
CORPORATION
GENERAL OFFICES · · · YOUNGSTOWN, OHIO

REPUBLIC STEEL

REG. U.S. PAT. OFF.
TONCAN
COPPER
MO-LYB-DEN-UM
IRON

gas to checker brick. This effect is at variance with the usual solution of such problems.

While not materially so, the transfer coefficients of the fixed fuel fired regenerator are somewhat greater than those of the air regenerator of the producer gas fired furnaces. Table CXXIV shows the fluid velocities are materially less through the fixed fuel fired regenerators. As the length of gas travel is the same in all of the typical designs it follows that the fluids through the fixed fuel fired design are in contact with the checker brick the longest time. This is another supporting item in heat transfer problems such as are encountered in open-hearth practice; the lowest velocity, developing the greatest time of contact, will effect the greatest overall heat exchange.

The coefficients of heat transfer calculated for the gas regenerator are likely much too high. The reason for this condition may be explained as follows:

Most investigators of open-hearth operation agree that in a modern producer fired furnace the temperature of the producer gas at the incoming throat will approach if not exceed 2200 degrees Fahr. (line d in Table CXXXV and lines 36 and 37 in Table CXXIX).

If the producer gas enters the regenerative system at 1250 degrees Fahr. (line m, Table CXXXV) and if 40 per cent of the furnace gas is taken to pass through the gas regenerative system as has been assumed in the case of the proposed furnace, then the coefficients of transfer must be of similar order to those listed Table CXXXVI.

The Kinney-McDermott and Clements balances, columns C and D in Table CXXIX, show the producer gas to enter the regenerators below 1100 degrees Fahr. (line 35). This indicates that if the temperature they show at the throat is to be accomplished the coefficients will be considerably greater than those quoted in Table CXXXVI. Therefore, a greater proportion of the furnace gas than the 40 per cent here used must be diverted to the regenerators in order to supply sufficient heat for later salvage by the producer gas in order that the final temperature may be secured. This, with any fixed gas nozzle is probably impossible of accomplishment; as a matter of fact it is probably impossible to divert even as little as 40 per cent of the furnace gas to the producer gas system.

For an explanation of this state-

Table CXXXVI

Coefficients of Heat Transfer

(Proposed Furnaces)

Proposed furnace type a	Regenerator b	Transfer condition c	Checkers only $t\Delta$ deg. Fahr. d	Checkers only k e	Entire system furnace throat to conn. flues $t\Delta$ deg. Fahr. f	Entire system furnace throat to conn. flues K g
Producer gas	Air	Furnace gas to brick	453	1.38	.....	.....
		Brick to air	372	1.68	.....	.....
		Furnace gas to air	825	1.53	.....	.....
	Gas	Furnace gas to brick	194	3.17	.....	.....
		Brick to air	181	3.40	.....	.....
		Furnace gas to air	375	3.27	.....	.....
	Air and gas combined	Furnace gas to brick	357	1.73	.....	.....
		Brick to producer gas	299	2.06	.....	.....
		Furn. gas to producer gas	656	1.89	.....	.....
Fixed fuel	Both	Furnace gas to brick	324	1.74	354	1.38
		Brick to air	301	1.88	296	1.68
		Furnace gas to air	625	1.81	650	1.53

ment the velocity lines of Fig. 177 should be examined. The producer gas velocity is charted at the right and at the extreme right edge or at the gas nozzle, A_3, the pressure on the producer gas necessary to cause the appropriate volume to pass, converted from the complimentary velocity, is shown as 1.8 inches (positive) water pressure, a common figure in producer gas practice and easily achieved by appropriate gas producer operation.

The velocity of 40 per cent of the furnace gases necessary to develop the ascribed superheat to the producer gas is given at the left of the chart. Thus in order to pass the appropriate volume of furnace gases counted through the gas nozzle, a pressure of 1.7 inches (negative) water pressure must be developed.

While it may be possible to create an effective suction of this magnitude, sustained satisfactory operation under such a condition hardly could be expected, all of which creates the thought that through generally faulty temperature measurements the gas regenerators of a producer gas fired furnace are credited with considerably more effectiveness than that to which they actually are entitled. Careful investigation and research of temperature and pressure conditions near the fuel nozzle and in the gas downtakes of producer gas fired furnaces would seem to be in order and worthwhile.

Value Should Not Be Exceeded

Omitting reference to the downtake and nozzle of the producer fired furnace examination of the flow valves through the several regenerators charted in Figs. 176 to 178, discloses maximum dynamic flow heads of 0.04-inch water pressure. This is a nominal value certainly, but one which should not be exceeded in the best design. The complimentary velocity value of this pressure (Fig. 46) is slightly less than 15 feet per second.

From the beginning of Chapter VII through the present chapter the text has covered the distribution of the fluids in and out of regenerator chambers, the characteristics of checker brick and the design of checkerwork, the heat exchange effects and a simple method of determining these.

The several subjects have been given considerable coverage not only on account of the value of the regenerative (or recuperative) system to any high temperature operation, but in the further thought that a simple system of quantitative analysis of any furnace operation is absolutely necessary if advancement and development are to proceed along sound technical rather than empirical lines. The system of quantitative analysis herein presented was developed progressively by the author from a rather crude beginning in 1908.

Many Details Are Presented

The system is presented in complete detail with the hope that its usefulness and simplicity may carry an appeal to technologists interested in the improvement of the economics of furnace operation, and that it may have a wide application. The system is capable of receiving much modification of detail, but it is further hoped that those who apply the methods will follow those advocated with sufficient closeness that their results essentially will be comparable with those of others who may use the plan "in toto"*

(To be continued)

*Correspondence with those who may be interested in the application of this method or its detail will be welcomed. The author should be addressed, P. O. Box 6093, Cleveland.

"HERE'S YOUR BIG OPPORTUNITY TO CUT EXPENSES..

**Actual monthly costs in a large middle-western plant in the steel industry.*

..and the Gulf Engineer Can Help You Do It!

HERE'S one big advantage in using Gulf lubrication in your plant: *It is the Gulf engineer's job* to assist you in reducing equipment maintenance expenses besides he mere cost of the lubricants.

And he is trained to do it. Every Gulf field engineer is a thoroughly experienced an—a lubrication specialist. He has worked with machin- y similar to yours in many plants and you benefit from his nowledge. A large staff of such men is employed by the ulf Refining Company. If you are not using Gulf products, hy not let a Gulf engineer advise you if the lubrication ractice in your plant is susceptible of improvement?

GULF INDUSTRIAL LUBRICATION

ULF REFINING COMPANY, PITTSBURGH, PA.

District Sales Offices: Boston · New York · Philadelphia · Atlanta
New Orleans · Houston · Pittsburgh · Louisville · Toledo

THIS BOOKLET has been prepared to assist you in analyzing and reducing your operating and maintenance costs. YOUR COPY IS READY

GULF REFINING COMPANY, S-1
3800 Gulf Building, Pittsburgh, Pa.

Please send without obligation, booklet "Lubrication Cost Recording."

Name.....

Title.....

Company.....

Address.....

Many Investigators Pursue Researches on Effect of Grain Size on Steel

GRAIN size of ferrous materials continues a subject of intense interest, consequently four papers presented at the annual meeting of the American Society for Metals in Chicago, Sept. 30-Oct. 4, dealt with this subject. Three of the papers were read at a grain size meeting on Wednesday afternoon, Oct. 2, while the fourth was given at a general session on Tuesday morning, Oct. 1.

In the grain size meeting, T. D. Yensen, manager, magnetic division, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., and N. A. Ziegler, sales research engineer, West Penn Electric Co., Pittsburh, contributed a paper on the effect of carbon, oxygen and grain size on the magnetic properties of iron-silicon alloys. This paper was a continuation of one presented a year ago on unalloyed iron and which subsequently won for the authors the Henry Marion Howe medal for the best paper published in the society's *Transactions* during the past year.

Oxygen Has Little Effect

The current paper gave numerical relationships between carbon, oxygen and grain size and the magnetic properties of iron-silicon alloys. In the presence of 3 per cent silicon or more, small amounts of oxygen have no appreciable effect on the low density magnetic properties. However, oxygen does affect markedly the high density permeability.

The large effect of carbon previously reported for iron-silicon alloys was generally confirmed, but the effect for carbon less than 0.01 per cent is not as large as reported in 1924 and varies with the silicon content. It appears to be greatest for 4 per cent silicon. For carbon less than 0.005 per cent, no precipitate is visible at 500 diameters, confirming the previous conclusion that in this low range carbon is either in solution or precipitated as colloidal particles.

Above 0.005 per cent, carbon is precipitated in various forms, depending on the silicon and carbon contents, but there seems to be no definite boundary line. From 0.005 to about 0.05 per cent the precipitate is Fe_2C for 3 per cent silicon, and partly Fe_3C and partly graphite for 4 to 6 per cent silicon. Above 0.05 per cent, carbon precipitates as pearlite for 3 per cent silicon and after short annealing at high temperatures —2010 to 2190 degrees Fahr.—but may be graphitized on prolonged heating at lower temperatures. For 4 to 6 per cent silicon, carbon (above 0.05 per cent) is precipitated as graphite.

Checks Previous Conclusion

The effect of carbon above 0.005 per cent on the magnetic properties depends on the form of the precipitate, being greatest for pearlite, intermediate for cementite (Fe_3C) and least for graphite, thus confirming the previous conclusion. In regard to grain size there can be no doubt as to the large effect of this factor, but again the effect varies with the silicon and carbon contents. For low carbon contents the effect appears to be generally greater than was reported in 1924, while for high carbon contents the agreement is fairly good.

Grain size and its influence on surface decarburizattion of steel was discussed in a paper by D. H. Rowland, graduate student, and Clair Upthegrove, professor of metallurgical engineering, University of Michigan, Ann Arbor, Mich. The authors set forth the results of their study of the effect of grain size on the surface decarburization of steel by moist hydrogen. The tests were confined to carbon steels ranging in carbon content from 0.71 to 1.07 per cent. Data obtained indicated that grain size influences the rate of carbon removal from steel.

The authors revealed that fine and coarse grained steels of substantially identical composition do not decarburize to a like degree. When subjected to the same decarburizing conditions, the coarse grained steels undergo the greater loss of carbon.

Effects of time and temperature on the character and width of the totally decarburized zone for fine and coarse grained steels was determined. The relative widths of the ferrite bands of coarse and fine grained steels remained practically independent of the time at the decarburization temperature. The maximum width of the ferrite band of both fine and coarse grained steels was found when decarburization occurred at approximately the A_3 transformation point of the steels investigated.

Consideration was given to the structure of the ferrite band as formed above and below the A_1 point. Data was submitted in support of the previously advanced theory that ferrite columnarization between 1290 and 1650 degrees Fahr. takes place as a result of the gamma to alpha phase change. A theory was put forward to explain the mechanism of ferrite columnarization below the A_1 point. Analyses of the gaseous products of decarburization were made and an explanation of the mechanism of decarburization advanced.

Grain Size In Cast Iron

Austenitic grain size in cast iron was the subject of a paper by D. W. Murphy, department of engineering research, and W. P. Wood, professor of metallurgical engineering, University of Michigan, Ann Arbor, Mich. As a result of their investigation thus far, the authors drew the following conclusions:

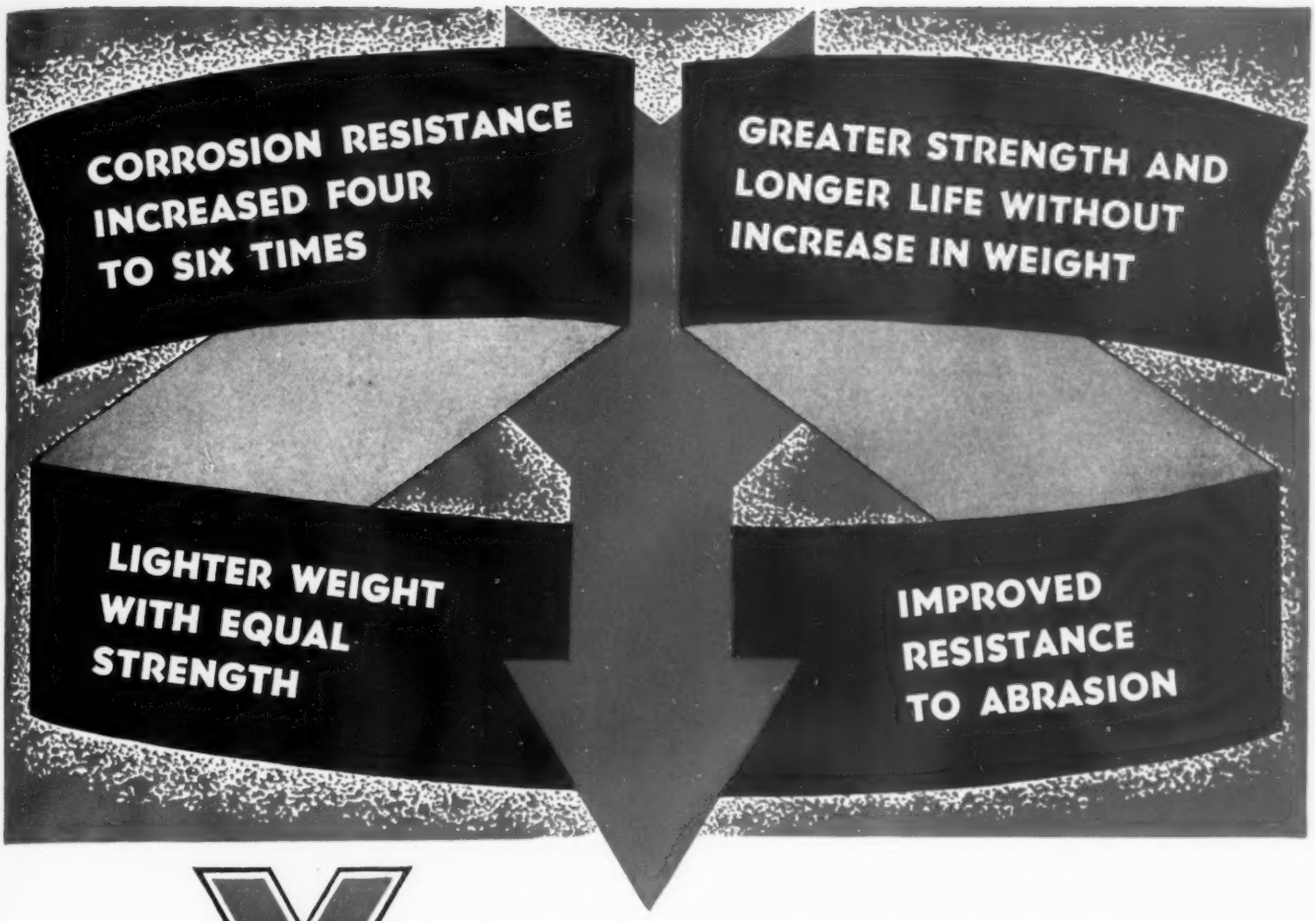
(1) In irons of approximately constant graphite characteristics and chemical composition, wide variations in physical properties may be due to austenitic grain size variations.

(2) Austenitic grain size characteristics affect powerfully the strength, hardness, distortion and hardenability of cast iron.

(3) As the austenitic grain size increases the as-cast strength and hardness and the distortion increase, probably because of the increased hardenability of the coarser grained irons.

(4) Control of grain size in cast iron should lead to important advances in the art of its heat treatment, to a better understanding of both unalloyed and alloyed cast iron and to a more efficient use of both types.

In a written discussion of the


CORROSION RESISTANCE INCREASED FOUR TO SIX TIMES
GREATER STRENGTH AND LONGER LIFE WITHOUT INCREASE IN WEIGHT
LIGHTER WEIGHT WITH EQUAL STRENGTH
IMPROVED RESISTANCE TO ABRASION

YOLOY

SHEETS.....STRIP.....PLATES.....BARS.....SHAPES
...WIRE...SEAMLESS and ELECTRIC WELD PIPE

Add the four advantages emphasized above to the production-factors of HIGHER DUCTILITY and WELDABILITY, and you have the major reasons why YOLOY will supplant ordinary carbon steels in hundreds of uses at a lower ultimate cost.

Send for YOLOY Bulletin, which tells the story and gives you the details of this remarkable intermediate steel of added performance. ··· It will be gladly and promptly mailed you on request.

YOLOY TRADE MARK YOUNGSTOWN STEEL

THE YOUNGSTOWN SHEET AND TUBE CO.
Manufacturers of Carbon and Alloy Steels
General Offices - - YOUNGSTOWN, OHIO

349

YOUNGSTOWN

paper, V. A. Crosby, metallurgical engineer, Climax Molybdenum Co., Detroit, stated he did not feel one to be justified in drawing conclusions from such a few samples investigated. He was constrained to believe that the difference in physical properties are entirely too great to be attributed to grain size alone. The authors' statement referring to effect of grain size on distortion was worthy of further consideration, said Mr. Crosby, especially since this is a problem of no mean proportion in most foundries.

The hardenability characteristics of fine and coarse grained cast irons as mentioned indicate close similarity to steels of various grain size. In fact, continued Mr. Crosby, this argument seems to be the most convincing that the subject under consideration is austenitic grain size. His own experience with irons of 30,000 to 45,000 pounds per square inch indicates no difference in grain size, but rather the difference could be traced to graphite distribution and matrix characteristics.

Differ In Hardenability

A. L. Boegehold, metallurgist, research division, General Motors Corp., Detroit, contributed a written discussion of the paper of Messrs. Murphy and Wood in which he also commented upon the likelihood that cast irons vary in their hardenability in a manner quite similar to variations in steel and he knew of no reason why this should not be so. However, he was not convinced that the evidence shown by the authors showed very well that the variation in degree of hardenability is related to austenitic grain size.

Concluding his remarks, Mr. Boegehold stated that although the authors' connection between austenitic grain size and hardenability seemed very tenuous, the important point after all was the fact that cast irons do exhibit differences in hardenability just as observed in steels and the authors were to be congratulated for presenting this point.

In a technical session held on the preceding day, F. G. Sefing, assistant professor, and K. J. Trigger, instructor in mechanical engineering, Michigan State college, Lansing, Mich., contributed a paper on the effect of grain size upon some physical properties of medium carbon steels. The authors showed that grain size has a profound influence on cracking and distortion in medium carbon steels. General conclusions can be summarized as follows:

(1) Fine-grained steels (5-8) showed no cracking while coarse-grained steels (1-4) always cracked in light and medium sections (up to 3 inches) when hardened.

(2) The cracking tendency of the coarse-grained steel is apparently associated with the nonmetallic inclusions.

(3) Fine-grained steel (5-8) is preferred where minimum variations in volume changes are desired in the hardened and tempered conditions.

(4) A higher surface hardness on medium sections (2 to 3 inches) may be obtained with the coarse-grained steels (1-4).

(5) The same heat treatment is permissible for both the coarse and fine-grained steels if the hardness specifications are below 250 brinell.

(6) Fine-grained steels are preferred where greater toughness and soundness are desired.

(7) Steels having a duplex grain size show the typical properties of either the coarse or fine-grained steel and therefore can not be depended upon.

Grain Size Exerts Profound Influence On Steel Wire and Wire Products

A FEATURE of the recent Chicago meeting of the Wire association was the presentation of a paper on "Grain Size and Its Influence on the Manufacture of Steel Wire," by B. L. McCarthy, metallurgist, Wickwire-Spencer Steel Co., Buffalo, N. Y. This paper won the 1935 award of the Wire association, having been judged the most meritorious paper on the art of wire manufacture or fabrication during the year. Mr. McCarthy's presentation of the subject in reality was more of a lecture on the practice of wiremaking from the scientific standpoint but was delivered in such a manner that men associated with the wire industry—no matter in what capacity—could follow understandingly. The paper, which ranks as the most noteworthy of any delivered before the association since its inception, was presented in full in the September issue of *Wire and Wire Products*.

Work completed in recent years, he explained, has thrown new light on the difference in inherent properties of heats of steel and the influence of these properties on the reactions which occur as a result of heat treatment. The speaker dealt at large with the McQuaid-Ehn grain size test—a method of grading heats of steel other than by analysis. While it is true, he stated, that this test does not tell the whole story, its use can be helpful as an indication of steel quality.

Variations on coarsening temperatures are important in connection with patenting, the speaker asserted. The influence of cold working on the coarsening temperature indicates what might be expected in process patenting. A fact to keep in mind, he said, is that while these influencing factors affect the coarsening tendencies of both coarse and fine grain steels, the coarse grain steels will continue to be coarse grain above 1700 degrees Fahr. regardless of hot or cold working. It, therefore, is desirable, he contended, to employ a coarse grain steel to avoid the nonuniformities that may exist as a result of variations in the coarsening temperatures associated with fine grain steels.

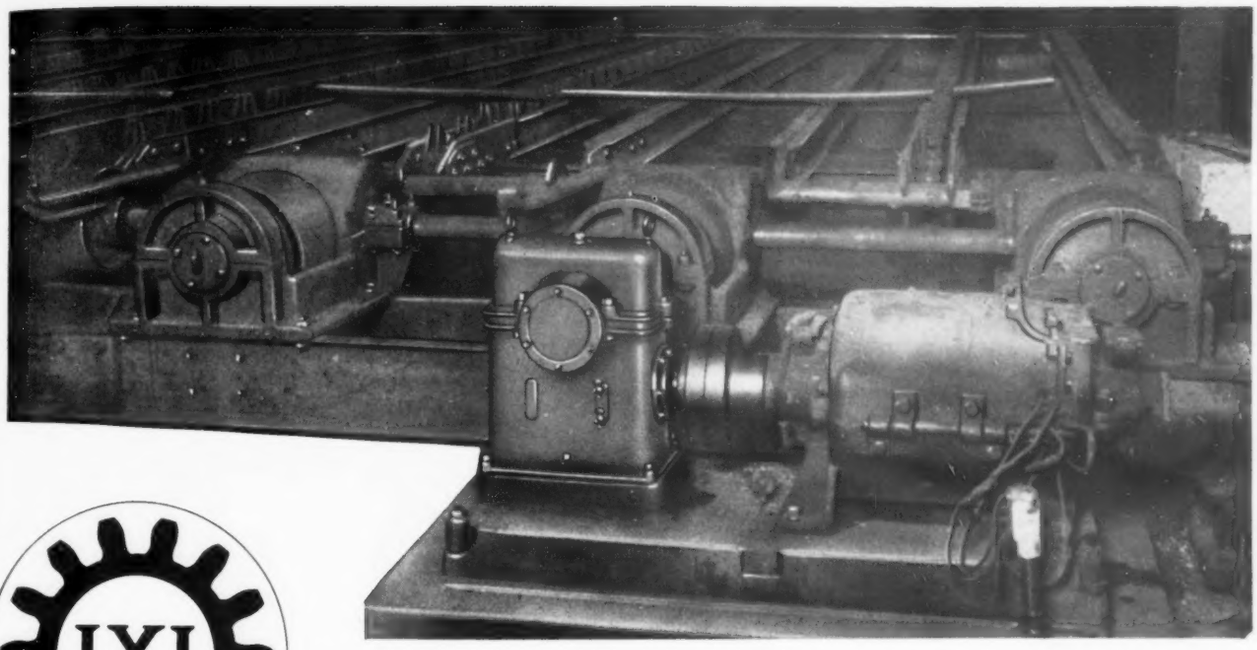
The normality of steel as indicated by this particular test, when considered in connection with steel to which no aluminum has been added to control grain size, is an indication of the amount of dissolved oxides in the metal. Mr. McCarthy pointed out that a careful study of the open-hearth charge, melt-down carbon, rate of carbon drop and slag condition is essential to the manufacture of suitable steel for the wire mill. Deoxidation of the metal also is an important step in steelmaking.

Aluminum in Ladle or Mold

The control of grain size in fine grain steel can be accomplished, according to the speaker, by the use of aluminum in the ladle or mold. The steel being treated first should be deoxidized, he explained, to avoid the formation of an excessive amount of aluminum oxide. Hot or cold work does not influence seriously the size of the austenitic grains as determined by the McQuaid-Ehn test, he asserted. The temperature at which the austenite grains coarsen, he continued, is important in the development of the patented grain size. So far as determined at present, Mr. McCarthy declared, a small amount of reduction in drawing seems to lower the grain coarsening temperature while heavy reductions seem to raise it.

Coarse grain steels have a slow reaction rate and fine grain steels a fast reaction rate. The rate of reaction has an influence on the fineness of the pearlite developed as a result of the patenting process. Dissolved oxides and fine grains by the development of large particles, may influence the rate at which the constituents go into solution, he stated.

Production of high-quality wire, in the speaker's opinion, depends upon the even distribution of cold work throughout the cross sections and he pointed out that this distribution depends upon the microstructure of the steel being drawn. He classified the

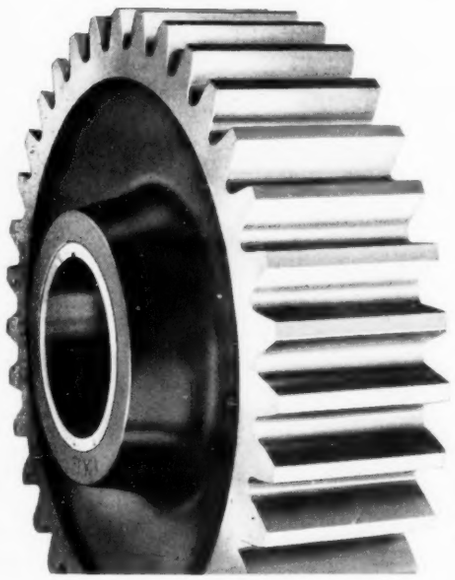


IXL
THE MARK OF QUALITY

This Mark Is Your Assurance of DEPENDABILITY in Speed Reducers and Gears of All Types

HOW much do you lose per year through shutdowns caused directly or indirectly by gear or reducer failures? Only exceptional gearing can dependably meet the requirements of steel mill operation. IXL products are designed and built to measure up to these exacting standards.

The IXL-ITE Tool Hard Gears are produced by a special carburizing and hardening process which insures four times longer life than can be obtained with untreated gears. The HCB resilient hard gears are heat-treated for high ductility and toughness of core which makes them especially adapted to shock service. IXL TITAN helical reducers with heat-treated helical gears and HYGRADE worm reducers with heat-treated alloy steel worms have made an enviable name for themselves in steel mills.



For 75 years, gear designing and manufacturing has been our specialty. This gives added assurance of satisfaction to the user. Our experienced engineers are ready to help select the right IXL reducer or gear for your needs. Our handbook, including complete rating tables is yours for the asking. Use IXL gears and IXL service and you take no chances.

Foote Bros.
GEAR AND MACHINE CO.
5311 SO. WESTERN BLVD. CHICAGO, ILL.

MEMBER OF AGMA

IXL—5311 S. Western Ave., Chicago, Ill.

- ☐ Please have your representative call.
- ☐ Please send me literature on the items checked.

☐ Industrial Worm Gears	☐ Speed Reducers Spur, Worm or Helical
☐ Heat-Treated Gears	☐ Powered Gears
☐ Friction Clutches	☐ Special Machinery
☐ Flexible Couplings	☐ Stoker Drives

Name .....

Company .....

Address .....

patenting operation as a prime factor in wiremaking inasmuch as it is the means by which the microstructure of the steel to be drawn is developed.

The difference in the reaction rates of coarse and fine grain steel also is noticeable in coarse and fine grain patented structures, Mr. McCarthy contended. Coarse grain patented structures, he explained tend to produce fine pearlite and less ferrite in the hypoeutectoid steel than fine grain patented structures. In conclusion the speaker emphasized the desirability of employing coarse grain steel for the manufacture of high-carbon wire because of the coarse patented grain size that results from its use.

That the elongation test does not appear to offer any reliable indication of the changes occuring when annealed copper wire is slightly cold worked by bending or elongation was shown by L. B. Barker, works laboratories, General Electric Co., who as co-author with C. A. Bailey, in charge of wire department section testing laboratory, General Electric Co., Schenectady, N. Y., spoke on the "Effect on the Physical Properties of Bending Copper Wire of Different Grain Sizes." When copper wire is bent around a form of a given diameter, the stiffness may increase, decrease or remain the same depending upon the initial hardness of the wire.

In the case of annealed wire, he explained, bending always increases the stiffness. The percentage increase varies inversely with the initial hardness and appears to be independent of the amount of previous reduction. A decrease in stiffness occurs only with hard wire, the speaker contended. The amount of decrease is comparatively slight and does not show the uniform variation with hardness observed in the annealed wire.

Minimizing Distortion in Welding Reviewed at Chicago Symposium

METHODS of minimizing distortion were described in a symposium on this subject during the Chicago meeting of the American Welding society. Discussion covered both light and heavy gage steel as well as cast metal. Practice followed by the Foster Wheeler Corp., New York, in preventing distortion of longitudinal seams in welded pressure vessels, according to J. T. Phillips of that company, includes the use of a single U groove method of welding. The cylinder is distorted at the seam by the use of supports, making the inside diameter at the seam greater than the specified diameter prior to welding. Forming the edges of the plate to the same radius as the rest of the cylinder rather than to a slightly larger radius has been found to produce the better results.

Knowledge of the fundamentals of welding in repairing equipment was emphasized in a paper by G. W. Hettrick, Anchor Welding Service Inc., Chicago, on "Handling Distortion in Maintenance Welding Problems." Importance of proper alignment of parts to be welded and the necessity of careful preheating in most instances before welding also were stressed. Illustrations were shown of several machinery parts which had been successfully welded together after breakage.

Minimizing distortion in welding light gage steel depends to a large extent on the use of suitable jigs for holding the work and on the skill of the welder, according to J. H. Blaha, General Household Utilities Co., Chicago. The speaker described the gas welding of refrigerator linings, one joint being a butt weld in which operation no rod is used. Jigs used are of heavy-section cast iron, large sections being employed to dissipate the heat.

The cutting torch has made five important contributions to the fabrication of tool equipment, it was pointed out by P. H. Danly, Danly Machine Specialties Co., Chicago, in a paper on "Machine Torch Cutting and Fabrication of Tool Equipment." These contributions include: Removal of many limitations as to material employed; elimination of pattern costs; reduction of weight; easier alterations in the equipment at any phase of the building at lower cost; and improvement in rigidity of the product.

Rolled Steel Easily Shaped

Advantages of rolled steel over cast iron in attainment of rigidity—a prime requisite—in machine tools were emphasized by the speaker as was also the flexibility of the cutting torch in fabricating parts of almost any conceivable shape, in many instances at a substantial saving in cost.

Typical examples of die sets and various machines built of rolled steel with the aid of the cutting torch were described. In the construction of high production machinery of complicated design, construction and operation, these can invariably be built at lower cost by the torch cut and weld method, the speaker stated.

Steel castings still have their place for certain parts and for certain purposes in machinery building, and one of the greatest benefits of the electric arc welding method of fabrication is the fact that it makes it possible to build steel castings into this new type of construction and thereby secure the benefits offered by both materials, according to Mr. Danly.

Resistance welding was described by M. L. Eckman, Thomson-Gibb Electric Welding Co., Lynn, Mass., as the world's best assembly method from the point of quality, speed and economy. This practice is followed in the assembly of the new steel radio tube. Manufacture of this product was detailed by the speaker.

A new general-purpose meter for resistance welding intended to offer a better basis of measurement of the various physical quantities involved in such work was described by C. Stansbury, Cutler-Hammer Inc., Milwaukee.

Germany Gets International Foundry Congress in 1936

Eighteen countries were represented at the European foundry congress held in Brussels, Belgium, Sept. 19-26. J. Leonard, manager of Societe d'Angleur-Athus, and president of the Association Technique de Fonderie de Belgique, was elected president of the International Committee of Foundry Technical associations, and the United States was designated to nominate the vice president for that year.

Germany issued a formal invitation to hold the sixth International Foundry congress in Dusseldorf in 1936. According to the calendar, congresses during the next four years will be as follows: In Germany in 1936, France in 1937, Poland in 1938 and Great Britain in 1939. The recently formed Spanish foundry association was accepted as a member of the International committee.

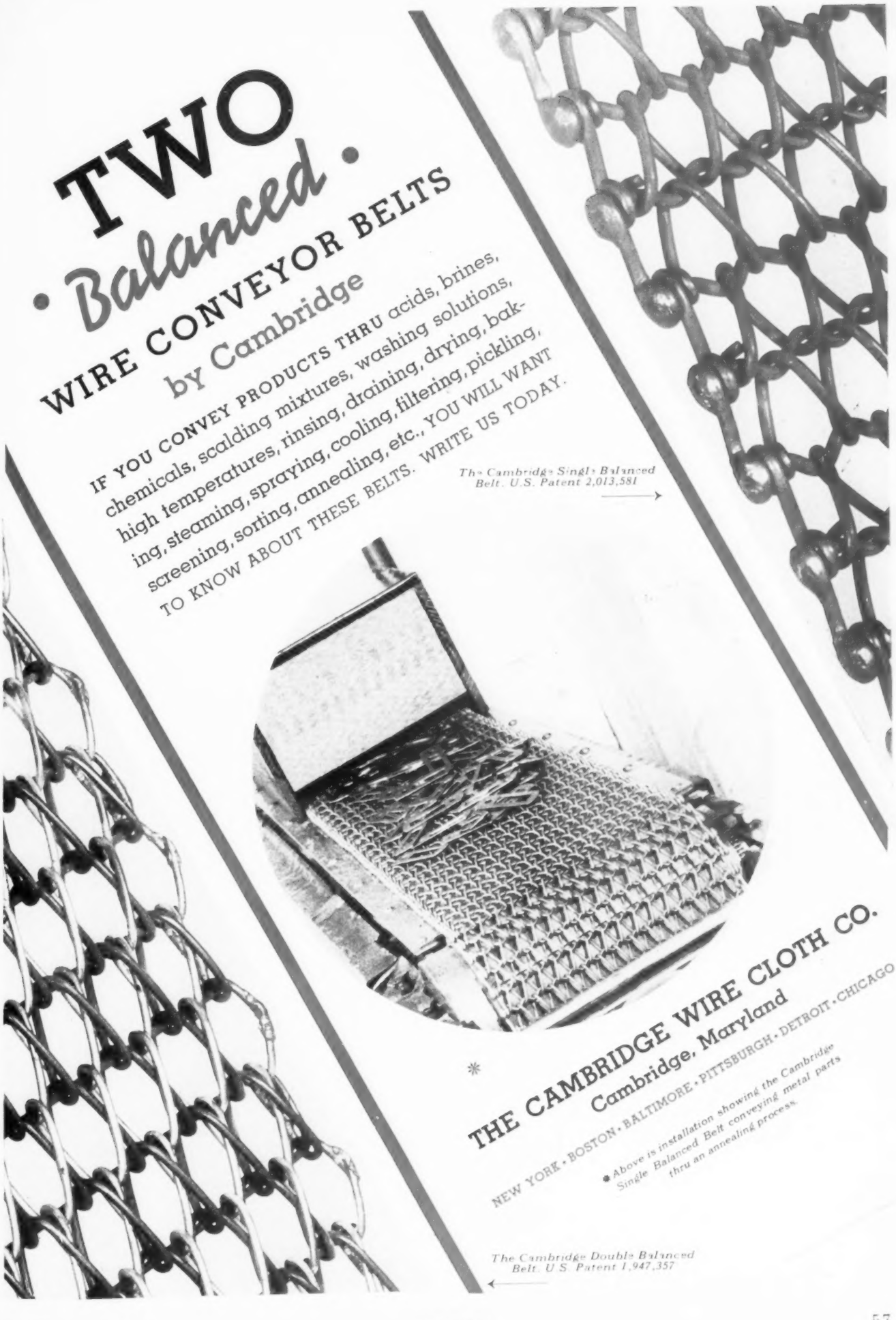
The decoration of Chevalier de l'Ordre de Leopold was bestowed upon President-elect Leonard for his work and efforts in support of the foundry industry and technical education. He has devoted 25 years of his life to the industry.

At a meeting of the International Committee for Testing Cast Iron, a complete plan of reorganization was submitted and adopted, making for methodical and continuous work.

The exchange paper of the American Foundrymen's association was prepared by Dr. H. A. Schwartz, manager of research, National Malleable & Steel Castings Co., Cleveland. The title of the paper was "The Field of Malleable Cast Iron."

TWO • Balanced • WIRE CONVEYOR BELTS by Cambridge

IF YOU CONVEY PRODUCTS THRU acids, brines, chemicals, scalding mixtures, washing solutions, high temperatures, rinsing, draining, drying, baking, steaming, spraying, cooling, filtering, pickling, screening, sorting, annealing, etc., YOU WILL WANT TO KNOW ABOUT THESE BELTS. WRITE US TODAY.



The Cambridge Single Balanced Belt. U.S. Patent 2,013,581

The Cambridge Double Balanced Belt. U.S. Patent 1,947,357

THE CAMBRIDGE WIRE CLOTH CO.
Cambridge, Maryland

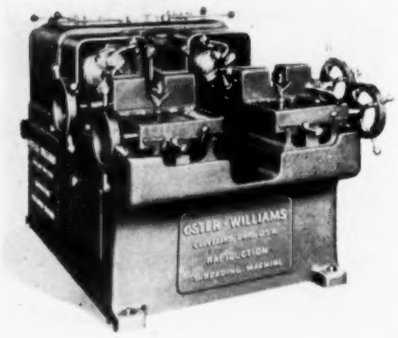
NEW YORK • BOSTON • BALTIMORE • PITTSBURGH • DETROIT • CHICAGO

* Above is installation showing the Cambridge Single Balanced Belt conveying metal parts thru an annealing process.

NEW EQUIPMENT

Bolt Machine—

Oster-Williams, 2057 East Sixty-first place, Cleveland, recently brought out a new bolt machine designated No. 922 and shown in the accompanying illustration. This unit, furnished in both single and double spindle types, is built for high production on standard runs in bolt plants and for increased production on an extremely wide variety of special work which goes into a manufacturer's product. Its regular bolt range covers all sizes from ½ to 2¼ inches at spindle speeds ranging from 32 to 196 revolutions per minute. A spindle bore of 3¼-inch and a vise adaptable to many different types of work holders, give it practically unlimited possibilities for work of special nature. The double spindle machine is equipped



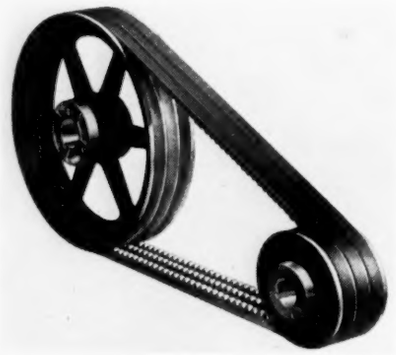
Oster-Williams No. 922 bolt machine has high speed steel dies

with a mechanical reverse on one spindle so that both right and left-hand threads can be cut simultaneously.

• • •

Pulleys—

Dayton Rubber Mfg. Co., Dayton, O., is announcing a complete new line of pulleys of cast-machined (semisteel) construction for use in conjunction with its cog-belt drive for all ratings up to 15 horsepower. These new units, shown herewith, are so formed as to be of maximum strength with elimination of all excess metal, thereby providing units of approximately the same weight as the pressed steel pulleys. Accurate



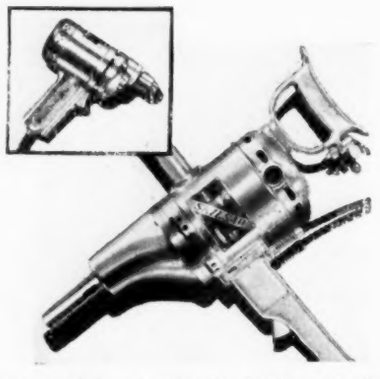
Cast-machined pulleys developed by Dayton Rubber Mfg. Co.

balance insures a true-running drive. The company, however, will continue to offer its pulleys in the pressed steel type with the same diameters as the cast-machined units.

• • •

Electric Drills—

Skilsaw Inc., Chicago, is announcing two new small drills and three large heavy-duty models. The 3/16 and ¼-inch high production units are designed particularly for assembly line work in industries where fast drilling of holes is required. Both are available in speeds of 2000, 2500, 3000 and 3700 revolutions per minute. The three large units, ⅝, ¾ and ⅞-inch sizes, are powerful, rugged and built to perform difficult assignments in drilling and reaming. On the ⅝-inch and ¾-inch models a 3-jaw geared chuck is furnished. The ⅞-inch unit is



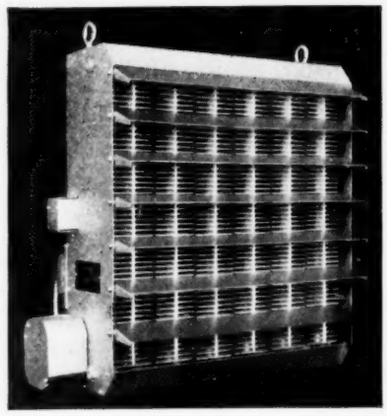
New models of electric drills recently added to Skilsaw line

equipped with a No. 2 Morse taper socket.

• • •

Electric Unit Heaters —

Electric Air Heater Co., division of the American Foundry Equipment Co., 555 Byrkit street, Mishawaka, Ind., is marketing electric unit heaters in three standard types under the name "Electromode." Units are made in various sizes in both rectangular and round shapes. The fin type grids, it is said, give the greatest dissipation of heat in a given area, making possible compact units of high B.T.U. output. Heat transformed from electrical energy is conducted quickly through



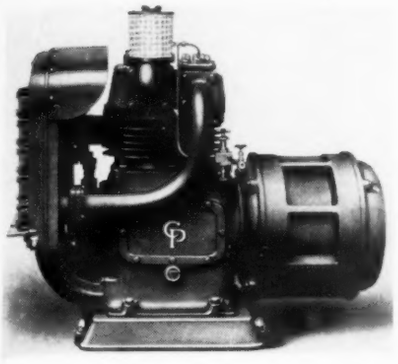
Unit heater placed on the market by Electric Air Heater Co.

the fin area by forced air circulation. Large convection surface enables operation at low temperature. Types include units suitable for industrial use.

• • •

Air Compressors—

Chicago Pneumatic Tool Co., 6 East Forty-fourth street, New York, is introducing a complete new line of air compressors. Shown herewith, these two-stage air-cooled units embody many refinements in design. Only two air cylinders are used on the two smallest sizes and four on the larger sizes, cast in pairs. Their vertical in-line arrangement permits using a separate crankpin for each



CP two-stage air cooled compressor has full floating piston pins and force feed lubrication

connecting rod, facilitating crankpin bearing adjustment. All cylinders are located in the direct path of the blast of cool air from the fan, and piping is simplified.

• • •

Voltage Regulator—

Acme Electric & Mfg. Co., Cleveland, is offering a new type of manual voltage regulator, shown herewith. It consists of an auto-transformer to which the primary line voltage is supplied. The transformer, traveling arm as well as all connections are contained in a ventilated steel case. On the face of the unit is mounted the regulating knob which provides manual control. A full range voltmeter indicates the exact secondary voltage adjustment. Standard receptacle for secondary output is likewise mounted on the face of this unit. A heavy duty,

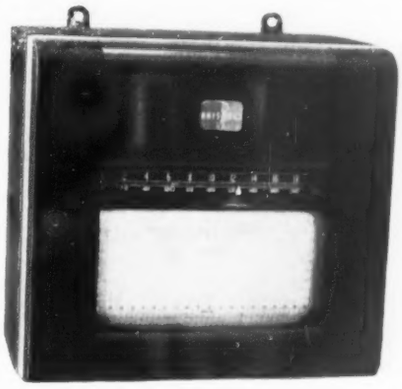
Acme manually-operated voltage regulator has wide use

rubber covered cord and plug is furnished as standard equipment for primary voltage connection.

• • •

Potentiometer Pyrometer—

Bristol Co., Waterbury, Conn., recently added to its line a wide strip pyrometer which is available in single-record, multiple-record and record-controller types. This instrument, operating on the potentiometer principle of temperature measurement, is characterized by its accuracy. In addition to the many features that are built into the measuring, balancing, and recording mechanism, this new pyrometer, shown herewith, records on a 12¼-inch chart, is equipped with a 11¼-inch indicating scale that can be read easily at a distance; uses a heavy-duty galvanometer which is totally enclosed in a dust-proof case; has a duplex slide wire mounted in such a position that the slide-wire contact and



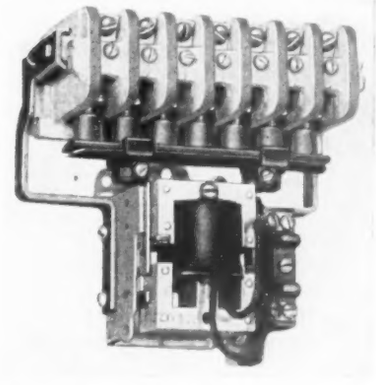
Bristol potentiometer pyrometer embodies simple measuring, balancing and recording mechanism

pen are integrally mounted on the same carriage; is housed in a convertible case which is moisture, fume, and dustproof; is fully automatic in operation and simple in construction.

• • •

Magnetic Contactor—

General Electric Co., Schenectady, N. Y., has brought out a compact new multipole magnetic contactor, designated as size 0 and rated 2 horsepower. The device, shown herewith, is intended for use either with small single-phase and polyphase alternating current motor, or as a flexible relaying device for complicated control systems, such as are used on machine



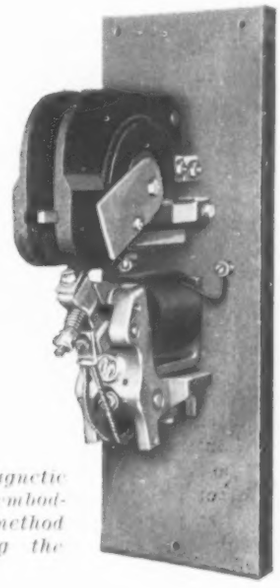
General Electric 2 horsepower multipole magnetic contactor

tools. It is available with either normally open or closed contacts, or with a combination of both. It may be controlled remotely through push button stations, limit switches, or other pilot devices. Any two forms of the contactor may be combined and mechanically interlocked either vertically or horizontally. A self-contained device, it is easily installed and can be mounted either as an open-type contactor or as an enclosed switch.

• • •

Magnetic Contactors—

Electric Controller & Mfg. Co., 2700 East Seventy-ninth street, Cleveland, is announcing a new line of magnetic contactors for both alternating and direct-current industrial service. These devices, one of which is shown herewith, embody a new method of handling the arc so that it is guided and controlled in a narrow path or line, centered between but not touching the arc shields. Light weight aluminum alloy construction employed in these contactors provides fast operation and quick response to the master



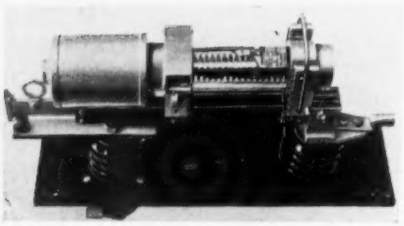
EC & M magnetic contactor embodies a new method of handling the arc

switch. Pure copper contacts hardened by a new process, are used. Applications include mill, crane and machinery controllers, welding machines, etc.

• • •

Fuse—

Schweitzer & Conrad Inc., 4435 Ravenswood avenue, Chicago, is placing on the market a new type C fuse that is especially suitable for industrial plants, substations, cubicles and confined space applications where the blowing of standard expulsion type fuses might cause damage. An accurate fuse element



Schweitzer & Conrad type C fuse with greater rupturing capacity

is used, with a heavily constructed arcing chamber and a condenser chamber at the top of the tube which is constructed of glass, thus permitting visual inspection. Capacities of the new unit, shown herewith, range from ½ to 400 amperes for 7500, 23,000 and 34,000 volt systems.

Tension in Foreign Ore Market Eases

(*Concluded from Page* 24)

political news of the past week or so, and what is said to be a present low margin of profit in the actual production of manganese.

Further, it is pointed out, there are good stocks in this country both in the form of ore and ferromanganese. While this in itself cannot be interpreted as a bullish factor, it does provide a "cushion", inasmuch as it would allow time for adjustments before domestic consumers would be in the market for attractive tonnages.

At present, notwithstanding generally good stocks, there is an active inquiry for 30,000 to 50,000 tons from a consumer who is said to manufacture ferromanganese at only wide intervals.

Recent reports that Russian ferromanganese ore is no longer being offered are in error. It is true that Russian iron is no longer available in this country due, it is said, to the consumption of this ore by Russia herself, which is now an unquestionably large user. However, her requirements of manganese ore still leave a good, although shrinking margin, for export abroad.

South African manganese ore, upon consolidation of control of important properties, will probably again be offered in world markets about Jan. 1. It appears doubtful, however, if this producer would be disposed to disturb the increasingly strong price structure of the manganese ore market.

Manganese ore, around 52 per cent, for the present is unchanged at 26c, c.i.f. seaboard, although, as noted in a previous issue, prices on several other foreign ores have been advanced. This latter development reflects increases in transportation costs, anywhere from 20 to 30 per cent. Insurance rates also have advanced and at a much higher rate of percentage; however, the latter is still a fairly negligible item in the cost of importing ore.

One important underwriter in New York, while asserting that war risk insurance is subject to almost constant fluctuation, pointed out a few days ago that at the moment shipments around the Cape of Good Hope were taking an insurance rate of about 2½ cents per $100 of value of goods transported, while those moving through the Mediterranean were taking a rate of 25 cents per $100.

In point of percentage of total cost even the Mediterranean rate is small, amounting to ¼ of 1 per cent. However, it apparently is sufficiently important in the movement of some types of merchandise to cause the diversion of shipments to over the longer route.

Still Debate War Embargo on Steel

WASHINGTON

STATE department officials do not feel that any further action is going to be taken by the League of Nations in connection with the embargoing of shipments of iron, steel, manganese ore, and similar products to Italy by league members until Oct. 31, at which time it is believed that final action will be taken on these sanctions as recommended by a committee specially appointed by the league.

In the meantime, the United States government and other nonmembers of the league have received communications from Geneva pointing out these proposed embargoes and asking the respective governments what, if anything, they will do about it or what they have to say on the subject. It cannot be learned at this time what the American government has in mind on this subject.

Denial is being made at the state department that Secretary of State Hull ever made any statement that it was possible that this government would embargo steel and similar products to Italy. It is stated officially that no decision has been reached on that point.

At the same time, there is certainly a war of words at the state department as to whether under the neutrality act steel could be added to the embargo list. There is much difference of opinion on this point.

It is pointed out by state department officials that the neutrality act calls for embargo lists on "arms, ammunition, or implements of war."

Government officials charged with the enforcement of the act maintain that there is a vast difference between "ammunition" and "munitions," and it may hinge on the legal interpretation of the words "ammunition" or "implements" as to whether iron and steel products can ever be added to the present embargo list or not—regardless of what the League may or may not finally decide to do on this subject.

Europe Prospers But War Deters

(*Concluded from Page* 17)

months. Exports of iron and steel during the first eight months of the year have increased by about 600,000 metric tons, but not far from 50 per cent of this trade is done under barter agreements with importing countries.

Generally speaking, industrial conditions in Germany have substantially improved, especially from the standpoint of production and the number of persons employed. However, Germany is still faced with a difficult financial situation, which makes it necessary to restrict imports of foodstuffs and raw materials to bare necessities. As a result, there is a certain amount of hardship among the people, and many difficult problems must be solved before general prosperity returns.

War Spurs Italian Plants

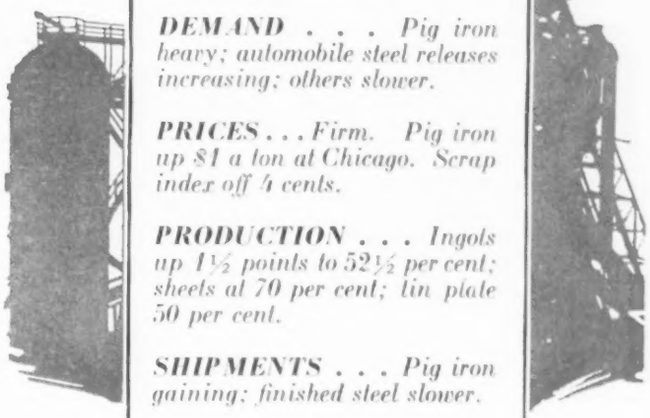
In Italy, iron and steel works have been busily engaged on the manufacture of war materials, with a consequent increase in steel production. However, the government keeps a close control on all contracts, and prices are strictly regulated. Unemployment has been substantially reduced, and now that a large number of men have been called to the colors, the problem, for the time being, has lost its acuteness. Severe restrictions are imposed upon imports, but preference is given to such raw material as coal and scrap, which are necessary to the steel industry.

Industrial conditions in Poland, Czecho-Slovakia and Austria have much improved. The construction of a new blast furnace has been started in Polish Upper Silesia. Domestic sales and export trade are expanding. Poland has joined the European steel cartel and has been allotted a quota of 350,000 metric tons.

Austrian steelworks, thanks to the impetus given by increased government orders, have improved their position. The Alpine Montan Gesellschaft registered a profit for 1934, against a loss the previous year; this concern, the most important in Austria, has recently been able to increase its labor force by about 1000 men.

Steel Rate Up 1½; Railroad Work Appearing

Automobile Demand Rises Steadily; Pig Iron Buying Heavy as Prices Advance



MARKET IN TABLOID

DEMAND . . . *Pig iron heavy; automobile steel releases increasing; others slower.*

PRICES . . . *Firm. Pig iron up $1 a ton at Chicago. Scrap index off 4 cents.*

PRODUCTION . . . *Ingots up 1½ points to 52½ per cent; sheets at 70 per cent; tin plate 50 per cent.*

SHIPMENTS . . . *Pig iron gaining; finished steel slower.*

WITH steadily mounting demands from automobile manufacturers, but a slackening in new commitments from other large consumers, steelworks operations continue to move within a narrow range, the national average last week advancing 1½ points to 52½ per cent.

Since the middle of August the steel rate has not varied more than 3 points, while it is now 2 points below the peak reached in February. Throughout the year automobile production has made exceptional progress; the agricultural implement industry and tin plate requirements reached new peaks, and equipment and miscellaneous orders have been heavy—while structural work in the aggregate has remained on a parity with 1934, and railroad purchases have declined.

Last week prospects for additional railroad purchases this year appeared brighter, mainly because of the need for more freight cars, revealed by recent heavy freight car loadings. Burlington, having decided to build in its own shops 1200 cars and three locomotives, is in the market for 20,000 tons of steel. Norfolk & Western purchased 6500 tons for car repairs, and placed 10,000 tons of rails.

Pennsylvania's revised schedule calls for building 11,000 freight cars, and at least 100 locomotives, taking 130,000 tons of rolled steel, though inquiries may not be issued until late this year. A northern road which planned to scrap 5000 freight cars will rebuild them. Exports inquiries for freight cars last week developed a potential market for 20,000 tons of steel.

Structural shape awards last week dropped to 10,721 tons, including 5700 tons for the Triboro bridge, New York. Reinforcing bar awards, 6924 tons, included 3400 tons for the Bonneville, Oreg., dam and 2200 tons for federal housing projects in Cleveland. Three interests shared in the award of 10,000 tons of 8-inch pipe and fittings by the Standard Oil Co. of Ohio for a 140-mile line from Toledo, O., to Crystal, Mich.

The market situation strongly favored producers of the lighter finished steels, principally sheets and strip, output of which increased moderately on specifications from automobile manufacturers. Ford is understood to have made a substantial purchase of sheets—estimated at 30,000 to 40,000 tons; and, possibly as a protection against a rise in raw materials, it was reported to have stocked 132,000 tons of billets and 28,000 tons of bars of its own output—about $8,000,000 worth of finished steel. Automobile production increased for the third consecutive week to 62,000.

Tractor production has not slackened, but the farm implement industry is gradually letting down after operating near capacity most of the year. This, however, does not reflect any change in the generally good outlook for that industry.

The advance of $1 a ton in pig iron prices at Chicago was not followed promptly last week with similar increases in other districts, and many melters covered their requirements for the remainder of the year. Domestic fluorspar again advanced 50 cents a ton. The stronger price situation in raw materials is to a large extent due to wage increases over the past year. One important steelworks interest last week definitely rejected a petition from its employ representation group for a 15 per cent wage advance.

On a 6000-ton bridge project in New York, reinforcing bar prices were shaded as much as $5 a ton. Mills are reinstating jobbers' allowances of $2 a ton on galvanized sheets, which were discontinued Oct. 1.

Steelworks operations last week advanced 1 point to 47 at Pittsburgh; 2 to 64, Cleveland; 4 to 62, Youngstown. Wheeling was down 3 to 78; Buffalo 10 to 40; Chicago 1 to 54, and other districts were unchanged.

STEEL'S iron and steel price composite is up 4 cents to $32.85; the finished steel index remains $53.70, while the scrap composite is down 4 cents to $12.67.

COMPOSITE MARKET AVERAGES

	Oct. 26	Oct. 19	Oct. 12	One Month Ago Sept., 1935	Three Months Ago July, 1935	One Year Ago Oct., 1934	Five Years Ago Oct., 1930
Iron and Steel	$32.85	$32.83	$32.86	$32.82	$32.44	$32.10	$32.35
Finished Steel	53.70	53.70	53.70	53.70	54.00	54.00	50.13
Steelworks Scrap	12.67	12.71	12.75	12.65	10.64	9.40	12.32

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

A COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	Oct.26, 1935	Sept. 1935	July 1935	Oct. 1934
Steel bars, Pittsburgh	1.85c	1.85c	1.80c	1.80c
Steel bars, Chicago	1.90	1.85	1.85	1.85
Steel bars, Philadelphia	2.16	2.11	2.11	2.09
Iron bars, Terre Haute, Ind.	1.75	1.75	1.75	1.75
Shapes, Pittsburgh	1.80	1.80	1.80	1.80
Shapes, Philadelphia	2.01½	2.01½	2.01½	2.00½
Shapes, Chicago	1.85	1.85	1.85	1.85
Tank plates, Pittsburgh	1.80	1.80	1.80	1.80
Tank plates, Philadelphia	2.00	1.99	1.99	1.98½
Tank plates, Chicago	1.85	1.85	1.85	1.85
Sheets, No. 10, hot rolled, Pitts.	1.85	1.85	1.85	1.85
Sheets, No. 24, hot ann., Pitts.	2.40	2.40	2.40	2.40
Sheets, No. 24, galvan., Pitts.	3.10	3.10	3.10	3.10
Sheets, No. 10, hot rolled, Gary	1.95	1.95	1.95	1.95
Sheets, No. 24, hot anneal., Gary	2.55	2.55	2.55	2.55
Sheets, No. 24, galvan., Gary	3.20	3.20	3.20	3.20
Plain wire, Pittsburgh	2.30	2.30	2.30	2.30
Tin plate, per base box, Pitts.	5.25	5.25	5.25	5.25
Wire nails, Pittsburgh	2.40	2.40	2.60	2.60

Semifinished Material

Sheet bars, open-hearth, Youngs.	$28.00	$28.00	$28.00	$28.00
Sheet bars, open-hearth, Pitts.	28.00	28.00	28.00	28.00
Billets, open-hearth, Pittsburgh	27.00	27.00	27.00	27.00
Wire rods, Pittsburgh	38.00	38.00	38.00	38.00

Pig Iron

	Oct.26, 1935	Sept. 1935	July 1935	Oct. 1934
Bessemer, del. Pittsburgh	$19.81	$19.81	$19.81	$19.76
Basic, Valley	18.00	18.00	18.00	18.00
Basic, eastern, del. eastern Pa.	19.76	19.81	19.81	19.76
No. 2 foundry, del. Pittsburgh	19.31	19.31	19.31	19.26
No. 2 foundry, Chicago	19.50	18.50	18.50	18.50
Southern No. 2, Birmingham	14.50	14.50	14.50	14.50
No. 2X eastern, del. Philadelphia	20.68	20.68	20.68	20.63
Malleable, Valley	18.50	18.50	18.50	18.50
Malleable, Chicago	19.50	18.50	18.50	18.50
Lake Superior charcoal, del. Chi.	24.75	24.25	24.25	24.04
Ferromanganese, del. Pittsburgh	90.13	90.13	90.13	89.79
Gray forge, del. Pittsburgh	18.67	18.67	18.67	18.80

Scrap

Heavy melting steel, Pittsburgh	$13.25	$13.45	$12.30	$10.50
Heavy melt. steel, No. 2, east. Pa.	11.00	11.25	10.50	8.00
Heavy melting steel, Chicago	12.50	12.55	10.40	8.75
Rails for rolling, Chicago	14.00	13.90	11.25	9.96
Railroad steel specialties, Chicago	13.25	13.75	12.00	9.75

Coke

Connellsville, furnace, ovens	$3.55	$3.25	$3.30	$3.60
Connellsville, foundry, ovens	4.35	4.00	4.25	4.60
Chicago, by-product foundry, del.	9.75	9.25	9.25	9.25

Steel, Iron, Raw Material, Fuel and Metals Prices

Except when otherwise designated, prices are base, f.o.b. cars. Asterisk denotes price change this week.

Sheet Steel

Hot Rolled No. 10, 24-48 in.

Pittsburgh	1.85c
Gary	1.95c
Chicago, delivered	1.98c
New York, del.	2.20c
Philadelphia, del.	2.16c
Birmingham	2.00c
St. Louis, del.	2.18c
Pacific ports, f.o.b. cars, dock	2.40c

Hot Rolled Annealed No. 24

Pittsburgh	2.40c
Gary	2.50c
Chicago, delivered	2.53c
Detroit, delivered	2.60c
New York, del.	2.75c
Philadelphia, del.	2.71c
Birmingham	2.55c
St. Louis, del.	2.72c
Pacific ports, f.o.b. cars, dock	3.05c

Galvanized No. 24

Pittsburgh	3.10c
Gary	3.20c
Chicago, delivered	3.23c
Philadelphia, del.	3.41c
New York, del.	3.45c
Birmingham	3.25c
St. Louis, del.	3.43c
Pacific ports, f.o.b. cars, dock	3.70c

Tin Mill Black No. 28

Pittsburgh	2.75c
Gary	2.85c
St. Louis, delivered	3.08c

Cold Rolled No. 10

Pittsburgh	2.50c
Gary	2.60c
Detroit, delivered	2.70c
Philadelphia, del.	2.81c
New York, del.	2.85c
Pacific ports, f.o.b. cars, dock	3.10c

Cold Rolled No. 20

Pittsburgh	2.95c
Gary	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.26c
New York, del.	3.30c

Enameling Sheets

Pittsburgh, No. 10	2.50c
Pittsburgh, No. 20	3.10c
Gary, No. 10	2.60c
Gary, No. 20	3.20c

Tin and Terne Plate

Gary base, 10 cents higher.

Tin plate, coke base (box) Pittsburgh	$5.25
Do., waste-waste	2.75c
Do., strips	2.50c
Long ternes, No. 24 unassorted, Pitts.	3.40c
Do., Gary	3.50c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	23.00	24.00
Plates	26.00	28.00
Sheets	33.00	35.00
Hot strip	20.75	22.75
Cold strip	27.00	29.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	17.00	18.50	21.00	26.00
Plates	20.00	21.50	24.00	29.00
Sheets	25.00	28.00	31.00	35.00
Hot strip	15.75	16.75	21.75	26.75
Cold stp.	20.50	22.00	27.00	35.00

Steel Plates

Pittsburgh	1.80c
New York, del.	2.09c
Philadelphia, del.	1.99c
Boston, delivered	2.22c
Buffalo, delivered	2.05c
Chicago or Gary	1.85c
Cleveland, del.	1.99½c
Birmingham	1.95c
Coatesville, base	1.90c
Sparrows Pt., base	1.90c
Pacific ports, f.o.b. cars, dock	2.35c
St. Louis, delivered	2.08c

Structural Shapes

Pittsburgh	1.80c
Philadelphia, del.	2.01½c
New York, del.	2.06½c
Boston, delivered	2.20½c
Bethlehem	1.90c
Chicago	1.85c
Cleveland, del.	2.00c
Buffalo	1.90c
Gulf Ports	2.20c
Birmingham	1.95c
Pacific ports, f.o.b. cars, dock	2.35c

Bars

Soft Steel

(Base, 5 to 25 tons)

Pittsburgh	1.85c
Chicago or Gary	1.90c
Duluth	2.00c
Birmingham	2.00c
Cleveland	1.90c
Buffalo	1.95c
Detroit, delivered	2.00c
Pacific ports, f.o.b. cars, dock	2.40c
Philadelphia, del.	2.16c
Boston, delivered	2.27c
New York, del.	2.20c
Pitts., forg. qual.	2.10c

Rail Steel

To Manufacturing Trade

Pittsburgh	1.70c
Chicago or Gary	1.75c
Moline, Ill.	1.75c
Cleveland	1.75c
Buffalo	1.80c

Iron

Troy, N. Y.	1.70c
Terre Haute, Ind.	1.75c
Chicago	1.80c
Philadelphia	2.06c
Pittsburgh, refined	2.75-7.50c

Reinforcing

New billet, straight lengths, quoted by distributors.

Pittsburgh	2.05c
Chicago, Gary, Buffalo, Cleve., Birm., Young	2.10c
Gulf ports	2.45c
Pacific coast ports f.o.b. cars dock	2.45c
Philadelphia, del.	2.36c

Rail steel, straight lengths, quoted by distributors

Pittsburgh	1.90c
Chicago, Buffalo, Cleveland, Birm., Young.	1.95c
Gulf ports	2.30c

Wire Products

(Prices apply to straight carloads; less than straight carloads take trade quantity extras; 10% dis. on nail extras on straight or mixed carloads to one consignee.)

Base Pitts.-Cleve. 100 lb. keg.

Standard wire nails	$2.40
Cement coated nails	2.40
Galvanized nails, 15 gage and coarser	4.40
do. finer than 15 gage	4.90

(Per pound)

Polished staples	3.10c
Galvanized fence staples	3.35c
Barbed wire, galv.	2.80c
Annealed fence wire	2.45c
Galvanized fence wire	2.80c
Woven wire fencing (base column, c.l.)	$58.00

To Manufacturing Trade

Plain wire, 6-9 gage 2.30c

Anderson, Ind. (merchant products only) and Chicago up $1 Duluth up $2; Birmingham up $3.

Spring wire, Pittsburgh or Cleveland 2.90c

Do., Chicago up $1, Worcester, $2.

Cold-Finished Carbon Bars and Shafting

Base, Pitts., one size, shape, grade, shipment at one time to one destination

10,000 to 19,999 lbs.	1.95c
20,000 to 59,999 lbs.	1.90c
60,000 to 99,999 lbs.	1.85c
100,000 lbs. and over	1.82½c

Gary, Ind., Cleveland, up 5c; Buffalo, up 10c; Detroit, up 20c; eastern Michigan, up 25c.

Alloy Steel Bars (Hot)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem 2.45c

Alloy S.A.E.	Alloy Diff.	Alloy S.A.E.	Alloy Diff.
2000	0.25	3100	0.55
2100	0.55	3200	1.35
2300	1.50	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo. 0.50
4600 0.20 to 0.30 Mo. 1.25-1.75 Ni. 1.05
5100 0.80-1.10 Cr 0.45
5100 Cr. spring base
6100 bars 1.20
6100 spring 0.70
Cr., Ni., Van. 1.50
Carbon Van. 0.95
9250 carbon base plus extras

Piling

Pittsburgh	2.15c
Chicago, Buffalo	2.25c

Strip and Hoops

Hot strip to 23⅛-in.

Pittsburgh	1.85c
Chicago or Gary	1.95c
Birmingham base	2.00c
Detroit, delivered	2.05c
Philadelphia, del.	2.16c
New York, del.	2.20c
Cooperage hoop, Pittsburgh	1.95c
Chicago	2.05c
Cold-strip strip, Pitts., Cleve.	2.60c
Worcester, Mass.	2.80c

Rails, Track Material

(Gross Tons)

Standard rails, mill	$36.37½
Relay rails, Pitts. 20-45 lbs.	$28.00
45-50 lbs.	$25.00
50-60 lbs.	$26.00
70-75 lbs.	$24.50
80-90 lbs.	$26.00
100 lbs.	$27.00
Light rails, billet qual. Pitts., Chi.	$35.00
Do., reroll. qual.	34.00
Angle bars, billet, Gary, Ind., So. Chi.	2.55c
Do., axle steel	2.10c
Spikes, R. R. base	2.40c
Track bolts, base	3.55c
Tie plates, base	1.90c

Base, light rails 25 to 40 lbs.; 50 to 60 lbs. inclusive up $2; 16 and 20 lbs., up $1; 12 lbs. up $2; 8 and 10 lbs., up $5. Base railroad spikes 200 kegs or more; base tie plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade for all case lots, Dec. 1, 1932, lists, 10% extra for less full containers.

Carriage Bolts

All sizes, cut thread	75 off
Rolled thread, ½ x 6, smaller	75 off

Machine Bolts

All sizes, cut thread lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts, stud bolts	75 off
Tire bolts	60 off
Stove bolts, 75 off in pkgs.; 83 off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.	
Rolled thread machine, ½ x 6, smaller	75 off
Step bolts	70 off
Elevator bolts	70 off

Nuts

S.A.E. semifinished hex.; ½ to ⅞-inch	75 off
Do., ½ to 1-inch	75 off
Do., over 1-inch	70 off

Hexagon Cap Screws

Milled	80-10-10 off
Upset, 1-in., smaller	85 off

Square Head Set Screws

Upset, 1-in., smaller	75-10 off
Headless set screws	75 off

Rivets, Wrought Washers

Struc., c. l., Pittsburgh, Cleveland	2.90c
Struc., c. l., Chicago	3.00c
⅞-in. and smaller, Pitts., Chi., Cleve.	70 and 5 off
Wrought washers, Pitts., Chi., Phila., to jobbers & large nut, bolt mfrs.	$6.25 off

Cut Nails

Cut nails, Pitts.; (10% discount on size extras)	$2.75
Do. less carloads, 5 kegs or more no discount on size extras	$3.05
Do. under 5 kegs; no discount on size extras	$3.20

Pipe and Tubing

Base $200 net ton, expect on standard commercial seamless boiler tubes under 2 inches and cold drawn seamless tubing.

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less. Chicago, del. 2½ points less. Wrought pipe, Pittsburgh.

Butt Weld

Steel

In.	Blk.	Galv.
¼ and ⅜	53½	35
½	58½	47
¾	62	52
1—3	64	55

Iron

½	31½	15
¾	36½	20½
1—1¼	39½	25½
2	41½	26

Lap Weld

Steel

2	60	51
2½—3	63	54
3½—6	65	56
7 and 8	64	54
9 and 10	63½	53½

Iron

2	37	22½
2½—3½	38	25
4—8	40	28½

Line Pipe

Steel

½, butt weld	57½
⅛-inch, butt weld	50½
¼—⅜, butt weld	52½
¾, butt weld	61
1—3, butt weld	63
2-inch, lap weld	59
2½—3, lap weld	62
3½—6, lap weld	64
7—8, lap weld	63

Iron

⅛—1½ inch, black and galv.	take 4 pts. over; 2½—6 inch 2 pts. over discounts for same sizes, standard pipe lists, 8—12-inch, no extra.

Boiler Tubes

C. L. Discounts, f.o.b. Pitts.

Lap Weld Steel		*Charcoal Iron*	
2—2¼	33	1¾	8
2½—2¾	40	2—2¼	13
3	47	2½—2¾	16
3¼—3½	50	3	17
4	52	3¼—3½	18
4½—5	42	4	20
		4½	21

In lots of a carload or more, above discounts subject to preferential of two 5% and one 7½% discount on steel and 10% on charcoal iron.

Lapwelded steel: 200 to 9999 pounds, ten points under base, one 5% and one 7½%. Under 2000 pounds 15 points under base, one 5% and one 7½%. Charcoal iron: 10,000 pounds to carloads, base less 5%; under 10,000 lbs., 2 points under base.

Seamless Boiler Tubes

Under date of May 15 in lots of 40,000 pounds or more for cold-drawn boiler tubes and in lots or 40,000 pounds or feet or more for hot-finished boiler tubes, revised prices are noted for 55 cold-drawn boiler tube sizes ranging from ¼ to 6-inch outside diameter in 30 wall thicknesses, decimal equivalent from 0.035 to 1.000, on a dollars and cents basis per 100 feet and per pound. Less-carloads revised as of July 1, 1935, card.

Hot-finished carbon steel boiler tube prices also under date of May 15 range from 1 through 7 inches outside diameter, inclusive, and embrace 47 size classifications in 22 decimal wall thicknesses ranging from 0.109 to 1.000, prices also being on a lb. and 100 ft. basis.

Seamless Tubing

Cold drawn; f.o.b. mill disc.

100 ft. or 150 lbs.	32%
15,000 ft. or 22,500 lbs.	70%

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

6-in. & over, Birm.	$39.00-40.00
4-in., Birmingham	42.00-43.00
4-in., Chicago	50.40-51.40
6 to 24-in. Chicago	47.40-48.40
6-in. & over, east. fdy.	43.00
Do., 4-in.	46.00

Class A pipe $3 over Class B. Stnd. fitgs., Birm. base, $100.00

Semifinished Steel

Billets and Blooms

4 x 4-inch base; gross ton

Pitts., Chi., Cleve., and Youngstown	$27.00
Philadelphia	32.67
Duluth	31.00

Forging Billets

6 x 6 to 9 x 9-in., base

Pitts., Chi., Buff.	35.00
Forging, Duluth	37.00

Sheet Bars

Pitts., Cleve., Young., Chi., Buff., Canton, Sparrows Pt.	28.00

Slabs

Pitts., Cleve., Young.	27.00

Wire Rods

(Common; combination up $2)

Pitts., Cleveland	38.00
Chicago	39.00
Worcester, Mass.	40.00

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Point	1.70c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$3.55- 3.75
Connellsville, fdry.	4.35- 4.50
Connel., prem. fdry.	5.50- 5.75
New River fdry.	6.00
Wise county fdry.	4.45- 5.00
Wise county fur.	4.00- 4.50

By-Product Foundry

Newark, N. J., del.	9.20- 9.65
Chi., ov., outside del.	9.00
Chicago, del.	9.75
New England, del.	11.50
St. Louis, del.	10.00
Birmingham, ovens	6.00
Indianapolis, del.	9.40
Cincinnati, del.	9.50
Cleveland, del.	9.75
Buffalo, ovens	7.50- 8.00
Detroit, ov., out. del.	9.00
Philadelphia, del.	9.03
Terre Haute, Ind., del.	9.50

Coke By-Products

Per gallon, producers' plants.

	Tank lots	Spot
Pure and 90% benzol	15.00c	
Toluol	30.00c	
Solvent naphtha	30.00c	
Commercial xylol	30.00c	

Per lb. f.o.b. New York.

Phenol (200 lb. drums)	16.30c
Do. (100 lbs.)	17.30c

Eastern Plants, per lb.

Naphthalene flakes and balls, in bbls., to jobbers	4.50c

Per 100 lb. Atlantic seaboard

Sulphate of ammonia	$1.20

†Western prices, ½-cent up.

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25; 50c diff. for each 0.25 below 1.75. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$19.50	$20.00	$19.00	$20.50
Birdsboro, Pa.	19.50	20.00	19.00	20.50
Birmingham, Ala., southern del.	14.50	14.50	13.50	20.00
Buffalo	18.50	19.00	17.50	19.50
*Chicago	19.50	19.50	19.00	20.00
Cleveland	18.50	18.50	18.00	19.00
Detroit	18.50	18.50	18.00	19.00
*Duluth	20.00	20.00	.....	20.50
Erie, Pa.	18.50	19.00	18.00	19.50
Everett, Mass.	19.50	20.00	19.00	20.50
Hamilton, O.	18.50	18.50	18.00	19.00
Jackson, O.	20.25	20.25	19.75	.....
Neville Island, Pa.	18.50	18.50	18.00	19.00
Provo, Utah	17.50	.....	17.00	.....
Sharpsville, Pa.	18.50	18.50	18.00	19.00
Sparrows Point, Md.	19.50	.....	19.00	.....
Swedeland, Pa.	19.50	20.00	19.00	20.50
Toledo, O.	18.50	18.50	18.00	19.00
Youngstown, O.	18.50	18.50	18.00	19.00
Delivered from Basing Points:				
Akron, O., from Cleveland	19.76	19.76	19.26	20.26
Baltimore from Birmingham	20.08	.....	18.96	.....
Boston from Birmingham	19.62	.....	19.50	.....
Boston from Everett, Mass.	20.00	20.50	19.50	21.00
Boston from Buffalo	20.00	20.50	19.50	21.00
Brooklyn, N. Y., from Bethlehem	21.93	22.43	.....	.....
Brooklyn, N. Y., from Bmghm.	21.55	.....	.....	.....
Canton, O., from Cleveland	19.76	19.76	19.26	20.26
Chicago from Birmingham	†18.72	.....	18.60	.....
Cincinnati from Hamilton, O.	19.51	19.51	19.01	.....
Cincinnati from Birmingham	19.38	.....	19.40	.....
Cleveland from Birmingham	19.04	.....	18.92	.....
Indianapolis from Hamilton, O.	20.93	20.93	20.43	21.43
Mansfield, O., from Toledo, O.	20.26	20.26	19.76	20.76
*Milwaukee from Chicago	20.57	20.57	20.07	21.07
Muskegon, Mich., from Chicago, Toledo or Detroit	21.60	21.60	21.10,	22.10
Newark, N. J., from Birmingham	20.61	.....	.....	.....
Newark, N. J., from Bethlehem	20.99	21.49	.....	.....
Philadelphia from Birmingham	19.53	.....	19.81	.....
Philadelphia from Swedeland, Pa.	20.31	20.81	19.81	.....
Pittsburgh district from Neville Island	Neville base plus $1.21		67c, 81c and switching charges	
Saginaw, Mich., from Detroit	20.75	20.75	20.25	20.25

Delivered from Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
*St. Louis, northern	20.00	20.00	19.50	.....
St. Louis from Birmingham	†18.62	.....	18.50	.....
*St. Paul from Duluth	21.94	21.94	.....	22.44

†Over 0.70 phos.

Low Phos

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $23.50. Phila. base, standard and copper bearing, $24.63.

Gray Forge		Charcoal	
Valley furnace	18.00	*Lake Superior fur.	$22.00
Pitts. dist. fur.	18.00	* Do., del Chicago	25.75
		Lyle, Tenn.	21.50

Silvery†

Jackson County, O., base; 6% $22.75; 7—$23.75; 8—$24.75; 9—$25.70; 10—$26.75; 11—$27.75. Buffalo base prices, up $1.25.

Bessemer Ferrosilicon†

Jackson County, O., base; 10%—$27.75; 11—$28.75; 12—$30.25; 13—$31.75; 14—$33.25; 15—$34.75; 16—$36.25. Buffalo base prices $1.25 higher.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon: 2 to 3%, $1 per ton additional; each unit over 3%, $1 per ton additional.

Refractories

Per 1000 f.o.b. Works

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$55.00

First Quality

Pa., Ill., Md., Mo.	$45.00
Alabama, Ga.,Ky.,	$40.00-45.00

Second Quality

Pa., Ill., Ky., Md., Mo.	40.00
Ga., Ala.	35.00

Ohio

First quality	$40.00
Intermediary	37.00
Second quality	28.00

Malleable Bung Brick

All bases	50.00

Silica Brick

Pennsylvania	$45.00
Joliet, E. Chicago	54.00
Birmingham, Ala.	52.00

Magnesite

Imported dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Domestic dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	40.00
Domestic dead-burned gr. net ton f.o.b. Chewelah, Wash. (bulk)	22.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$45.00
Chemically bonded chrome brick	45.00
Magnesite brick	65.00
Chemically bonded magnesite brick	55.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$20.00
*Washed gravel, f.o.b. Ill., Ky., net ton, carloads	$16.00

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82% tidewater, duty paid	85.00
Do., Balti. base	85.00
Do., del. Pittsb'gh	90.13
Spiegeleisen, 19-20% dom. Palmerton, Pa., spot†	26.00
Do., New Orleans	26.00
Ferrosilicon, 50% freight all., cl.	77.50
Do., less carload	85.00
Do., 75 per cent Spot, $5 a ton higher.	126-130.00
Siliconan., 2½ carb.	90.00
2% carbon, 95.00; 1%,	105.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. del.	10.00
Ferrotungsten, stand., lb. con. del.	1.35- 1.45
Ferrovanadium, 35 to 40% lb., cont.	2.70-2.90
Ferrotitanium, c. l., prod. plant, frt. allow., net ton	137.50
Spot, 1 ton, frt. allow., lb.	7.00
do., under 1 ton	7.50
Ferrophosphorus, per ton, c. l., 17-19% Rockdale, Tenn., basis, 18%, $2 unitage	50.00
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24% $2.75 unitage	65.00
Ferromolybdenum, stand. 55-65%, lb.	0.95
Molybdate, lb. cont.	0.80

†Carloads, Quan. diff. apply.

Nonferrous

METAL PRICES OF THE WEEK

Spot unless otherwise specified. Cents per pound

	Copper: Electro, del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin: New York Spot	Straits Tin: New York Futures	Lead: N. Y.	Lead: East St. L.	Zinc: St. L.	Aluminum 99%	Antimony: Chinese Spot, N. Y.	Nickel Cathodes
Oct. 19	9.25	9.37½	8.85	50.75	48.75	4.50	4.35	4.85	*19.00	16.37½	35.00
Oct. 21	9.25	9.37½	8.85	50.65	48.62½	4.50	4.35	4.85	*19.00	16.37½	35.00
Oct. 22	9.25	9.37½	8.85	51.00	48.40	4.50	4.35	4.85	*19.00	16.37½	35.00
Oct. 23	9.25	9.37½	8.85	51.00	48.00	4.50	4.35	4.85	*19.00	16.00	35.00
Oct. 24	9.25	9.37½	8.85	51.25	48.50	4.50	4.35	4.85	*19.00	16.00	35.00
Oct. 25	9.25	9.37½	8.85	51.75	48.75	4.50	4.35	4.85	*19.00	16.00	35.00

*Nominal range 19.00 to 21.00c.

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 9.00c Conn. copper.

Sheets	
Yellow brass (high)	14.62½
Copper hot rolled	16.25
Lead cut to jobbers	8.25
Zinc, 100-lb. base	9.50
Tubes	
High yellow brass	16.62½
Seamless copper	16.75
Rods	
High yelow brass	13.12½
Copper, hot rolled	13.50
Anodes	
Copper untrimmed	14.00
Wire	
Yellow brass (high)	15.12½

OLD METALS

Dealers' buying prices, cents lb.

No. 1 Composition Red Brass	
*New York	5.50- 5.75
Cleveland	5.87½-6.12½
*Chicago	5.87½- 6.00
St. Louis	6.00- 6.25
Heavy Copper and Wire	
*New York, No. 1	6.75- 7.00
*Chicago, No. 1	6.87½-7.12½
Cleveland	6.75- 7.00
St. Louis, No. 1	7.25- 7.37½
Composition Brass Borings	
*New York	5.00- 5.25
Light Copper	
*New York	5.75- 6.00
*Chicago	5.87½-6.12½
Cleveland	5.75- 6.00
St. Louis	6.00- 6.25
Light Brass	
Chicago	3.25- 3.50
Cleveland	3.12½-3.37½
St. Louis	3.50- 3.75
Lead	
*New York	3.50- 3.75
Cleveland	3.25- 3.50
*Chicago	3.37½- 3.62½
St. Louis	3.75- 3.85
Zinc	
*New York	2.00- 2.25
Cleveland	2.50- 2.75
St. Louis	2.75- 3.00
Aluminum	
Borings, Cleveland	8.50- 9.00
Mixed, cast, Cleve.	13.25-13.50
Mixed, cast, St. L.	13.00-13.50
Clips, soft, Cleve.	14.75-15.00

SECONDARY METALS

Brass ingot, 85-5-5-5	9.25
*Stand. No. 12 alum.	17.00-17.50

Iron and Steel Scrap Prices

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL

Birmingham	8.50- 9.50
Boston, dock, expt.	9.25- 9.50
Boston, domestic	7.50- 7.75
Buffalo, No. 1	12.00-12.50
Buffalo, No. 2	10.50-11.00
Chicago, No. 1	12.25-12.75
Cleveland, No. 1	12.00-12.50
Cleveland, No. 2	11.00-11.50
Detroit, No. 1	9.50-10.00
Detroit, No. 2	8.00- 8.50
Eastern Pa., No. 1	12.00
Eastern Pa., No. 2	11.00
Federal, Ill.	9.25- 9.75
Granite City, R. R.	10.50-11.00
Granite City, No. 2	8.75- 9.25
N. Y., deal. No. 2	7.50- 7.75
N. Y., deal. barge	8.50- 8.75
Pitts., No. 1 (R. R.)	14.50-15.00
Pitts., No. 1 (dlr.)	13.00-13.50
Pittsburgh, No. 2	11.75-12.25
St. Louis	8.50- 9.00
Valleys, No. 1	13.00-14.00

COMPRESSED SHEETS

Buffalo, dealers	10.50-11.00
Chicago, factory	11.50-12.00
Chicago, dealer	10.25-10.75
Cleveland	11.50-12.00
Detroit	9.75-10.25
E. Pa., new mat.	11.50-12.00
Pittsburgh	13.00-13.50
St. Louis	6.25- 6.75
Valleys	12.50-13.00

BUNDLED SHEETS

Buffalo	8.00- 8.50
Cincinnati, del.	7.50- 8.00
Cleveland	9.50-10.00
Pittsburgh	11.50-12.00
St. Louis	4.50- 5.00

SHEET CLIPPINGS, LOOSE

Chicago	8.00- 8.50
Cincinnati	7.00- 7.50
Detroit	5.00- 5.50
St. Louis	4.75- 5.25

STEEL RAILS, SHORT

Birmingham	12.00-12.50
Buffalo	14.50-15.00
Chicago (3 ft.)	14.00-14.50
Chicago (2 ft.)	15.00-15.50
Cincinnati, del.	13.50-14.00
Detroit	12.50-13.00
Pitts., open-hearth, 3 ft. and less	15.25-15.75
St. Louis, 2 ft. & less	13.25-13.75

STEEL RAILS, SCRAP

Boston	7.50- 7.75
Chicago	12.25-12.75
Pittsburgh	14.25-14.75
St. Louis	11.50-12.00
Buffalo	12.00-12.50

STOVE PLATE

Birmingham	7.00- 7.50
Boston, dealers	3.50- 3.75
Buffalo	10.25-10.75
Chicago	8.00- 8.50
Cincinnati, dealers	7.00- 7.50
Detroit, net	7.00- 7.50
Eastern Pa.	9.50
N. Y., deal. fdry.	6.00
St. Louis	8.00- 8.50

COUPLERS, SPRINGS

Buffalo	14.50-15.00
Chicago, springs	13.50-14.00
Eastern Pa.	14.50-15.00
Pittsburgh	15.25-15.75
St. Louis	12.00-12.50

ANGLE BARS—STEEL

Chicago	13.00-13.50
St. Louis	12.00-12.50

RAILROAD SPECIALTIES

Chicago	13.00-13.50

LOW PHOSPHORUS

Buffalo, billet and bloom crops	14.50-15.00
Cleveland, billet, bloom crops	15.00-15.50
Eastern Pa., crops	15.50-16.00
Pittsburgh, billet, bloom crops	16.00-16.50
Pittsburgh, sheet bar crops	14.75-15.25

FROGS, SWITCHES

Chicago	12.25-12.75
St. Louis, cut	11.50-12.00

SHOVELING STEEL

Chicago	12.25-12.75
Federal, Ill.	9.25- 9.50
Granite City, Ill.	8.75- 9.25

RAILROAD WROUGHT

Birmingham	8.00- 8.50
Boston, dealers	6.00- 6.50
Buffalo, No. 1	10.50-11.00
Buffalo, No. 2	12.00-12.50
Chicago, No. 1, net	9.50-10.00
Chicago, No. 2	12.25-12.75
Cincinnati, No. 2	9.50-10.00
Eastern Pa.	12.00-12.50
N. Y., No. 1, deal.	9.50-10.00
St. Louis, No. 1	6.75- 7.20
St. Louis, No. 2	10.25-10.75

SPECIFICATION PIPE

Boston	3.00- 3.25
Eastern Pa.	10.00
New York, dealers	3.50- 4.00

BUSHELING

Buffalo, No. 1	10.50-11.00
Chicago, No. 1	11.00-11.50
Cinci., No. 1, deal.	7.50- 8.00
Cincinnati, No. 2	4.00- 4.50
Cleveland, No. 2	8.00- 8.50
Detroit, No. 1, new	8.50- 9.00
Valleys, new, No. 1	12.25-12.75

MACHINE TURNINGS

Birmingham	3.50- 4.00
Boston, dealers	3.25- 3.50
Buffalo	5.75- 6.25
Chicago	6.50- 7.00
Cincinnati, dealers	5.50- 6.00
Cleveland	7.75- 8.25
Detroit	5.00- 5.50
Eastern Pa.	7.50- 8.00
New York, dealers	3.75- 4.00
Pittsburgh	9.50-10.00
St. Louis	2.25- 2.75
Valleys	8.50- 9.00

BORINGS AND TURNINGS

For Blast Furnace Use

Boston, dealers	2.50- 2.75
Buffalo	7.75- 8.25
Cincinnati, dealers	5.00- 5.50
Cleveland	8.00- 8.50
Detroit	5.50- 6.00
Eastern Pa.	6.00- 6.25
New York, dealers	1.50- 1.75
Pittsburgh	8.00- 9.00

CAST IRON BORINGS

Birmingham, plain	3.50- 4.00
Boston, chemical	5.50- 6.50
Boston, dealers	3.25- 3.50
Buffalo	7.75- 8.25
Chicago	6.00- 6.50
Cincinnati, dealers	5.00- 5.50
Cleveland	8.00- 8.50
Detroit	5.50- 6.00
E. Pa., chemical	11.00-12.00
New York, dealers	1.50- 1.75
St. Louis	3.00- 3.50

PIPE AND FLUES

Cincinnati, dealers	6.50- 7.00

RAILROAD GRATE BARS

Buffalo	8.50- 9.00
Chicago, net	7.50- 8.00
Cincinnati	5.50- 6.00
Eastern Pa.	9.00- 9.50
New York, dealers	4.50- 5.00
St. Louis	4.50- 5.00

FORGE FLASHINGS

Boston, dealers	5.75- 6.00
Buffalo	10.50-11.00
Cleveland	10.00-10.50
Detroit	8.00- 8.50
Pittsburgh	11.50-12.00

FORGE SCRAP

Boston, dealers	4.50- 5.00
Chicago, heavy	13.50-14.00
Eastern Pa.	11.50-12.00

ARCH BARS, TRANSOMS

St. Louis	12.00-12.50

AXLE TURNINGS

Boston, dealers	3.00- 3.50
Buffalo	10.50-11.00
Chicago, elec. fur.	12.00-12.50
Eastern Pa.	11.00
St. Louis	7.75- 8.25

STEEL CAR AXLES

Birmingham	12.00-12.50
Boston, ship. point.	10.50-11.00
Buffalo	14.50-15.00
Chicago, net	14.50-15.00
Eastern Pa.	17.00
St. Louis	12.50-13.00

SHAFTING

Boston, ship point.	13.00-13.25
Eastern Pa.	18.50
New York, dealers	13.50-14.00
St. Louis	11.00-11.50

CAR WHEELS

Birmingham	9.00-10.00
Boston, iron deal.	6.00- 6.25
Buffalo, iron	11.00-11.50
Buffalo, steel	14.50-15.00
Chicago, iron	12.50-13.00
Chicago, rolled steel	13.00-13.50
Cincinnati, iron	10.00-10.50
Eastern Pa., iron	12.50-13.00
Eastern Pa., steel	14.50-15.00
Pittsburgh, iron	13.50-14.00
Pittsburgh, steel	15.00-15.50
St. Louis, iron	10.00-10.50
St. Louis, steel	12.00-12.50

NO. 1 CAST SCRAP

Birmingham	9.00- 9.50
Boston, No. 1 mach.	9.00- 9.25
Boston, No. 2	8.00- 8.25
Boston, tex. con.	8.50- 9.00
Buffalo, cupola	12.25-12.75
Buffalo, mach.	13.00-13.50
Chicago, agri. net	9.50-10.00
Chicago, auto	10.50-11.00
Chicago, mach. net	11.50-12.00
Chicago, railr'd net	10.00-10.50
Cinci., mach. cup	10.00-10.50
Cleveland, cupola	12.25-12.75
Detroit, net	10.00-10.50
Eastern Pa., cupola	12.50-13.00
E. Pa., mixed yard	10.50
Pittsburgh, cupola	13.75-14.25
San Francisco, del.	13.50-14.00
Seattle	7.50- 9.00
St. Louis, No. 1	9.50-10.00
St. L., No. 1 mach.	11.75-12.25

HEAVY CAST

Boston, del.	6.00- 6.25
Buffalo, break.	10.50-11.00
Cleveland, break	10.00
Detroit, No. 1, mach. net	12.00-12.50
Detroit, break.	8.50- 9.00
Detroit, auto net	11.50-12.00
Eastern Pa.	11.50
N. Y., break. deal.	7.25- 7.75
Pittsburgh	12.75-13.25

MALLEABLE

Birmingham, R. R.	10.50-11.00
Boston, consum.	13.50-14.50
Buffalo	14.50-15.00
Chicago, R. R.	14.50-15.00
Cincinnati, agri. del.	11.00-11.50
Cleveland, rail	15.50-16.00
Detroit, auto net	12.50-13.00
St. Louis, R. R.	13.00-13.50
Eastern Pa., R. R.	13.00-13.50

RAILS FOR ROLLING

5 feet and over

Birmingham	11.50-12.00
Boston, dealers	8.00- 8.50
Buffalo	12.00-12.50
Chicago	13.75-14.25
Eastern Pa.	13.00-14.00
New York, dealer	10.50-11.00
St. Louis	12.25-12.75

LOCOMOTIVE TIRES

Chicago (cut)	13.50-14.00
St. Louis, No. 1	11.75-12.25

LOW PHOS. PUNCHINGS

Buffalo	14.50-15.00
Chicago	14.50-15.00
Eastern Pa.	15.00-16.00
Pittsburgh (heavy)	15.00-15.50
Pittsburgh (light)	14.00-14.50

Iron Ore

Lake Superior Ore

Gross ton, 51½% Lower Lake Ports

Old range bessemer	$4.80
Mesabi nonbess.	4.50
High phosphorus	4.40
Mesabi bessemer	4.65
Old range nonbess.	4.65

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63% con. (nom.)	8.00- 9.00
Cop.-free low phos. 58-60% (nom.)	10.00-10.50

Foreign Ore

Cents per unit, f.a.s. Atlantic ports (nominal)

Foreign manganiferous ore, 45.55% iron, 6-10% man.	10.50
No. Afr. low phos.	10.50
Swedish basic, 65%	9.50
Swedish low phos.	10.50
Spanish No. Africa basic, 50 to 60%	10.50
Tungsten, spot sh. ton unit, duty pd.	$15.50-16.00
N. F. fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	19.25

Manganese Ore

(Nominal)

Prices not including duty, cents per unit cargo lots

Caucasian, 52-55%	26.00
So. African, 52%	26.00
So. Afr., 49-51%	24.00
Indian, 58-60%	nominal
Indian, 48-50%	nominal

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

STEEL BARS

Baltimore*	3.05c
Boston††	3.00c
Buffalo	3.00c
Chattanooga	3.31c
Chicago (j)	3.00c
Cincinnati	3.22c
Cleveland	3.00c
Detroit	3.09c
Houston	3.00c
Los Angeles	3.60c
Milwaukee	3.06c
New Orleans	3.30c
New York‡(d)	3.31c
Pitts. (h)	2.95c-3.10c
Philadelphia*	3.03c
Portland	3.70c
San Francisco	3.50c
Seattle	3.70c
St. Louis	3.25c
St. Paul	3.25c-3.40c
Tulsa	3.25c

IRON BARS

Portland	3.40c
Chattanooga	3.31c
Baltimore*	3.05c
Chicago	2.75c
Cincinnati	3.22c
New York‡(d)	3.36c
Philadelphia*	2.93c
St. Louis	3.20c
Tulsa	3.25c

REINFORCING BARS

Buffalo	2.60c
Chattanooga	3.31c
Chicago	2.10c-2.60c
Cleveland (c)	2.10c
Cincinnati	3.25c
Houston	3.25c
Los Ang., cl.	2.45c
New Orleans	3.50c
Pitts., plain (h)	3.05c
Pitts., twisted squares (h)	3.175c
San Francisco	2.45c
Seattle	2.45c
St. Louis	3.25c
Tulsa	3.25c
Young.	2.30c-2.60c

SHAPES

Baltimore*	3.00c
Boston††	3.19c
Buffalo	3.25c
Chattanooga	3.56c
Chicago	3.20c
Cincinnati	3.42c
Cleveland	3.31c
Detroit	3.42c
Houston	3.00c
Los Angeles	3.60c
Milwaukee	3.31c
New Orleans	3.55c
New York (d)	3.46c
Philadelphia*	2.98c
Pittsburgh (h)	3.15c
Portland (i)	3.70c
San Francisco	3.50c
Seattle (i)	3.70c
St. Louis	3.45c
St. Paul	3.45c
Tulsa	3.50c

PLATES

Baltimore*	3.00c
Boston††	3.21c
Buffalo	3.37c
Chattanooga	3.56c
Chicago	3.20c
Cincinnati	3.42c
Cleveland, ¼-in. and over	3.31c
Detroit	3.42c
Detroit, ⅜-in.	3.65c
Houston	3.00c
Los Angeles	3.60c
Milwaukee	3.31c
New Orleans	3.55c
New York (d)	3.40c
Philadelphia*	2.98c
Phila. floor	4.95c
Pittsburgh (h)	3.15c
Portland	3.55c
San Francisco	3.50c
Seattle	3.55c
St. Louis	3.45c
St. Paul	3.45c
Tulsa	3.50c

NO. 10 BLUE

Baltimore*	3.10c
Boston††	3.30c
Buffalo	3.62c
Chattanooga	3.36c
Chicago	3.05c
Cincinnati	3.22c
Cleveland	3.11c
Det., 8-10 ga.	3.14c
Houston	3.35c
Los Angeles	3.70c
Milwaukee	3.16c
New Orleans	3.55c
New York	3.31c
Portland	3.75c
Philadelphia*	3.08c
Pittsburgh (h)	2.95c
San Francisco	3.60c
Seattle	3.75c
St. Louis	3.45c
St. Paul	3.30c
Tulsa	3.70c

NO. 24 BLACK

Baltimore*†	3.60c
Boston (g)	2.95c
Buffalo	3.25c
Chattanooga	4.21c
Chicago	3.85c
Cincinnati	4.02c
Cleveland	3.91c
Detroit	3.94c
Los Angeles	4.35c
Milwaukee	3.96c
New Orleans	4.50c
New York	3.89c
Philadelphia*†	3.60c
Pitts.** (h)	3.55c
Portland	4.40c
San Francisco	4.25c
Seattle	4.40c
St. Louis	4.10c
St. Paul	3.90c
Tulsa	4.75c

NO. 24 GALV. SHEETS

Baltimore*†	4.30c
Buffalo	4.00c
Boston (g)	4.65c
Chattanooga	4.86c
Chicago (h)	4.55c
Cincinnati	4.72c
Cleveland	4.61c
Detroit	4.72c
Houston	4.40c
Los Angeles	4.95c
Milwaukee	4.66c
New Orleans	4.95c
New York	4.50c
Philadelphia*†	4.40c
Pitts.** (h)	4.15-4.45c
Portland	5.00c
San Francisco	5.00c
Seattle	5.00c
St. Louis	4.65c
St. Paul	4.50c
Tulsa	5.10c

BANDS

Baltimore*	3.20c
Boston††	3.30c
Buffalo	3.42c
Chattanooga	3.61c
Chicago	3.30c
Cincinnati	3.47c
Cleveland	3.36c
Detroit, ⅞-in. and lighter	3.39c
Houston	3.25c
Los Angeles	4.10c
Milwaukee	3.41c
New Orleans	3.95c
New York (d)	3.56c
Philadelphia	3.18c
Pittsburgh (h)	3.20c
Portland	4.25c
San Francisco	4.10c
Seattle	4.25c
St. Louis	3.55c
St. Paul	3.55c
Tulsa	3.45c

HOOPS

Baltimore	2.30c
Boston	4.30c
Buffalo	3.42c
Chicago	3.30c
Cincinnati	3.47c
Det., No. 14 and lighter	3.39c
Los Angeles	5.85c
Milwaukee	3.41c
New York	3.56c
Philadelphia	3.43c
Pittsburgh (h)	3.70c
Portland	5.60c
San Francisco	6.15c
Seattle	5.60c
St. Louis	3.55c
St. Paul	3.55c

COLD FIN. STEEL

Baltimore (c)	3.58c
Boston	3.75c
Buffalo (h)	3.40c
Chattanooga*	3.98c
Chicago (h)	3.35c
Cincinnati	3.57c
Cleveland (h)	3.35c
Detroit	3.49c
Los Ang. (f) (d)	5.85c
Milwaukee	3.46c
New Orleans	4.15c
New York	3.81c
Philadelphia	3.61c
Pittsburgh	3.20c
Portland (f) (d)	6.00c
San Fran. (f) (d)	5.80c
Seattle (f) (d)	6.00c
St. Louis	3.60c
St. Paul	3.87c
Tulsa	4.50c

COLD ROLLED STRIP

Boston, 0.100-in., 500 lb. lots	3.245c
Buffalo	3.39c
Chicago	3.27c
Cincinnati (b)	3.22c
Cleveland (b)	3.20c
Detroit	3.33c
New York	3.36c
St. Louis	3.45c

TOOLS STEELS

(Applying on or east of Mississippi river; west of Mississippi 1c up)

	Base
High speed	57c
High carbon, high chrome	37c
Oil hardening	22c
Special tool	20c
Extra tool	17c
Regular tool	14c

Uniform extras apply.

BOLTS AND NUTS

(100 pounds or over)

	Discount
Chicago (a)	70
Cleveland	70
Detroit	70-5
Milwaukee	70
Pittsburgh	70-10-5

(a) Under 100 pounds, 65 off.

(b) Plus straightening, cutting and quantity differentials; (c) Plus mill, size and quantity extras; (d) Minus quant. diff.; (e) New mill classif. (f) Rounds only; (g) 50 bundles or over; (h) Outside delivery, 10c less; (i) Under 3 inches; (j) shapes other than rounds, flats, fillet angles, 3.15c.

‡Domestic bars; *Plus quan. extras; **Under 25 bundles; *†50 or more bundles; †New extras apply; ††Base 40,000 lbs., extras on less.

Prices on heavier lines are subject to new quantity differentials; 399 lbs. and less, up 50 cts.; 400 to 9999 lbs., base; 10,000 to 19,999 lbs., 15 cts. under; 20,000 to 39,999 lbs., 25 cts. under; 40,000 lbs. and over, 35 cts. under base.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, Oct. 24

Export Prices f. o. b. Ship at Port of Dispatch—(By Cable or Radio)

	British gross tons U. K. ports £ s d	Continental Channel or North Sea ports, metric tons Quoted in dollars at current value	**Quoted in gold pounds sterling £ s d
PIG IRON			
Foundry, 2.50-3.00 Silicon	$15.38 3 2 6	$14.17	1 15 0
Basic bessemer	15.38 3 2 6*	12.95	1 12 0
Hematite, Phos. .03-.05	15.99 3 5 0	.....	.....
SEMIFINISHED STEEL			
Billets	$27.06 5 10 0	$19.02	2 7 0
Wire rods, No. 5 gage	41.82 8 10 0	36.44	4 10 0
FINISHED STEEL			
Standard rails	$40.59 8 5 0	$44.53	5 10 0
Merchant bars	1.65c 7 10 0	1.15c to 1.20c	3 2 6 to 3 5 0
Structural shapes	1.62c 7 7 6	1.14c	3 1 6
Plates, †¼ in. or 5 mm.	1.76c 8 0 0	1.56c	4 5 0
Sheets, black, 24 gage or 0.5 mm	2.09c 9 10 0	2.13c	5 16 0††
Sheets, gal., 24 gage, corr.	2.53c 11 10 0	2.28c	6 5 0
Bands and strips	1.87c 8 10 0	1.46c	4 0 0
Plain wire, base	2.04c 9 5 0	1.96c	5 7 6
Galvanized wire, base	2.36c 10 15 0	2.29c to 2.36c	6 5 6 to 6 7 6
Wire nails, base	2.64c 12 0 0	2.11c	5 15 0
Tin plate, box 108 lbs.	$4.61 0 18 9	.....	.....

British ferromanganese $85 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d ($43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

	£ s d	French Francs		Belgian Francs		Reich Marks
Fdy. pig iron, Si. 2.5	$16.61 3 7 6(a)	$17.16	260	$12.46	370	$25.54 63
Basic bessemer pig iron	17.22 3 10 0(a)	12.54	190	11.12	330	27.96 (b) 69.50
Furnace coke	4.18 0 17 0	6.27	95	3.88	115	7.64 19
Billets	27.06 5 10 0	28.38	430	18.20	540	38.82 96.50
Standard rails	1.82c 8 5 0	2.08c	694	1.65c	1,100	2.42c 132
Merchant bars	1.89c 8 12 0	1.68c	560	90c	600	2.01c 110
Structural shapes	1.93c 8 15 0	1.65c	550	90c	600	1.97c 107.50
Plates, †¼-in. or 5 mm.	1.99c 9 1 5	2.10c	700	1.05c	700	2.32c 127
Sheets, black	2.42c 11 0 0§	1.80c	600‡	1.24c	825‡	2.64c 144‡
Sheets, galv., corr., 24 ga. or 0.5 mm	2.86c 13 0 0	3.23c	1,075	2.25c	1,500	6.77c 370
Plain wire	2.04c 9 5 0	3.15c	1,050	1.73c	1,150	3.17c 173
Bands and strips	2.06c 9 7 0	1.95c	650	1.26c	840	2.32c 127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continental usually for basic-bessemer steel. a del. Middlesbrough. b hematite. ††Close annealed.

**Gold pound sterling carries a premium of 66.25 per cent over paper sterling.

Bars

Bar Prices, Page 62

Pittsburgh — Allocation of bar purchases has been completed by Ford Motor Co. against its tonnage requirements mostly for November assemblies. The steel purchase which the Ford company completed about ten days ago was the largest since last July. Bar requirements of farm implement manufacturers are less, but other automotive requirements, plus sustained demand for bars for cold finishing and miscellaneous purposes, are encouraging. Base price on alloy steel bars holds at 2.45c.

Cleveland — Steel bar specifications for October will represent the largest tonnage of any month so far this year. A slow but gradual increase is reported in orders from automobile manufacturers and forge shops on automobile work. Several builders of road machinery and excavating equipment have indicated larger requirements. Consumers generally did not contract fully for fourth quarter before the recent advance of $1 a ton and are expected in the market shortly. All makers report substantial tonnages in miscellaneous orders.

Chicago — Automotive bar releases have risen to the best level in about two months. Improvement is offset partly by a slight decrease in demand from miscellaneous consumers, while some hesitation also is apparent in production of seasonal types of farm implements. Tractor manufacturers continue busy, however. Cold-finished bar demand has suffered somewhat recently from anticipatory buying in September.

Boston—Bar releases are slightly heavier and small lot purchases have increased. Demand is well spread with miscellaneous industrial consumers leading, the total in alloy bars being substantial. Forging bars continue fairly active with a good demand for specialty material and tool steel. Prices are steady and unchanged.

New York—Inquiry for 362 tons of chain, closing Oct. 31, bureau of lighthouses, Staten Island, is the largest in months. Included are 549 pieces of wrought iron buoy chain ¾ to 1⅝-inches in diameter and 128 pieces of bridle chain for buoy anchorage.

Igoe Bros., Brooklyn, N. Y., has been awarded 275 tons of mild steel bars, one-half to one-inch diameters, by the United States engineer, first district, New York, bids Sept. 27. Carnegie Steel Co., Pittsburgh, booked 250 tons of heat-treated bar steel for the Washington navy yard.

Philadelphia — Both commercial and alloy bar tonnages reflect improved demands from the automotive industry, although buying before the change in quantity extras and deductions at the beginning of this month has left its effect. Current prices are steady at 1.85c, Pittsburgh, for commercial steel bars, or 2.16c, Philadelphia.

Youngstown, O.—Merchant bar specifications are coming from a wider variety of consumers and bar mills are operating around 55 per cent of capacity. So urgent is the need represented by some buyers that shipments are demanded the same day as receipt of specifications. The question of price no longer is raised.

Plates

Plate Prices, Page 62

Pittsburgh—Additional to six 175 x 26 x 11-foot steel barges requiring 1200 tons of plates which Campbell Transportation Co. placed with McClintic-Marshall Corp., (STEEL, Oct. 14) the Campbell Transportation Co. has placed an order for one steel tank barge, 195 x 35 x 9½ feet, with Treadwell Construction Co., Midland, Pa. Both steel and aluminum are specified in the construction of a 44 x 11 x 5 2/3-foot steel hull pusher boat for United States engineers, on which bids will be opened Nov. 13 at Pittsburgh. Morris Knowles Co., Pittsburgh, engineers on the State College, Pa., 200-ton elevated tank, advise that pending adjustment on bids for the tank's superstructure, no award has been made.

Cleveland — Tonnage is increasing slowly, mainly of a miscellaneous character. Producers find consumers more willing to contract for forward requirements, as prices show considerable strength. The Diamond Alkali Co., Fairport, O., has awarded a 200,000-cubic foot spherical gas holder, taking 155 tons of plates.

Chicago—While plates are in slightly better demand from railroad car repair shops, such tonnage still is light and is not expected to improve materially until some anticipated car buying programs develop. Plate demand elsewhere, except for structural work, is confined to small individual lots. Inquiries for tanks and major construction projects are light.

New York—Following dullness in the first half of the month some good plate tonnage is being figured for foreign car inquiries. Pan American Petroleum Co., New York, has placed some special refining equipment for Texas City, Tex., with the Foster-Wheeler Corp., New York, requiring about 600 tons of plates. Substantial additional tonnage is pending for work at Texas City and Beaumont, Tex. Atlantic, Gulf & Pacific Co., 13 Park Row, New York, is inquiring for 56 pontoons requiring 150 tons of plates. Texas Empire Pipe Line will install four tanks requiring about 2000 tons of plates.

Boston—Medium-size tank and boiler requirements are heavier, more such projects being up for bids. Shipyard needs are heavier with bids in on 2595 tons for navy yards, Boston and Portsmouth, N. H. Current buying is well maintained in small lots for miscellaneous needs with an improved demand for industrial uses. Prices are steady at 2.22c, Boston.

Philadelphia—Plate tonnage has declined, pending placing of navy schedules on which bids have been recently taken and pending any appreciable gain in tank work. Railroad repair work is slightly better, however, and in a limited degree eastern platemakers are benefiting from placing of steel for freight cars to be built by the Norfolk & Western at Roanoke, Va. Prices are unchanged at 1.90c, Coatesville, Pa., or 1.99½c, Philadelphia.

San Francisco—The only plate letting of size involved 100 tons of 16-inch welded steel pipe for Arcadia, Calif., placed with an unnamed interest. Bids open Nov. 19, under specification 133, for pumping units for the metropolitan water district, Los Angeles, calling for 1860 tons. St. George, Utah, has taken bids on 11½ miles of 12, 14 and 16-inch, 10 and 12 gage, welded steel pipe, requiring over 450 tons.

Seattle—Awards are pending for schedule 2 of Tacoma's water system improvement, 19,450 feet of 42 to 58-inch pipe. Romano Engineering Corp., Seattle, is low at $486,854 for the complete job, all steel pipe. Steel requirements are 1250 tons. Tacoma will call bids next month for the last schedule of the extension program calling for about 2000 tons of steel plate. Everett, Wash., has selected wrapped steel pipe for its crosstown main, about 1000 tons, previously announced awarded to Puget Sound Machinery Depot, Seattle.

Contracts Placed

200 tons, one 195 x 35 x 9½-foot steel tank barge, for Campbell Transportation Co., Pittsburgh, to Treadwell Construction Co., Midland, Pa.

155 tons, 200,000-cubic foot sperical gas holder, Diamond Alkali Co., Fairport, O., to McClintic-Marshall Corp., Bethlehem, Pa.

100 tons, 16-inch welded pipe, Arcadia, Calif., to unnamed interest.

Unstated tonnage, 200,000-gallon elevated tank, elipsoidal design, Highland Springs section, Richmond, Va., for Henrico county, to Chicago Bridge & Iron Works, Chicago, $11,400, bids Sept. 16 bid.

Contracts Pending

2000 tons, Schedule 3, Tacoma, Wash., pipe line extension; bids in November.

1250 tons, Tacoma water system extension; bids in.

450 tons, 12 to 16-inch welded steel pipe, 10 and 12 gage, St. George, Utah; bids opened.

200 tons, elevated steel water tank, State College, Pa.; award delayed until bids on superstructure are adjusted; Morris Knowles & Co., Pittsburgh, engineers.

200 tons, buoys, various types and sizes, lighthouse bureau, Staten Island, N. Y., bids Oct. 21, 29, Nov. 6 and 12; inquiries include 450 unlighted units of welded steel plate construction closing Oct. 29; larger buoys are riveted.

Unstated tonnage, one 35-ton derrick boat, United States engineer office, first district, New York, bids Nov. 7.

Unstated tonnage, three 45-foot steel hull diesel engine survey boats, United States engineer, Louisville, Ky., bids Nov. 12.

Unstated tonnage, 900 feet welded discharge pipe; bids to United States engineers at Vicksburg, Miss., Oct. 29.

Transportation

Track Material Prices, Page 63

Pending export inquiries for freight cars involve 15,000 to 20,000 tons of rolled steel, including about 9000 tons for 1000 box cars for the Argentine state railway and 5000 tons for 450 gondolas for the South African railway, with a rumor the latter has been placed with a builder. About 4000 tons of steel is being figured here for equipment recently placed in Canada with subsidiaries of American builders. Eastern mills have participated in distribution of 6500 tons of steel for the Norfolk & Western car building program.

Chicago, Burlington & Quincy plans to start Jan. 1 on its largest equipment program since 1929, including building in its own shops three freight locomotives, 750 coal cars, 500 box cars with wood sides and roof, requiring more than 20,000 tons of steel.

Rollings were commenced last week and will continue through this week by Carnegie-Illinois Steel Corp. against an order for 7500 tons of 131-pound rails by the Norfolk & Western. The latter placed 10,000 tons in all, 2500 tons having been awarded to Bethlehem Steel Co. Carnegie-Illinois Steel Corp. has also been rolling against an additional 500-ton order placed recently by the Wheeling & Lake Erie and its share of several thousand tons of the Chesapeake & Ohio's 13,000-ton order of about three weeks ago.

Foreign competition on American light rail business is reported to be a disturbing influence in some quarters and the $35 base on new billet quality light rails has been under some pressure. In part, this explains the adjustment downward in size extras taken in the 50-60-pound light rail bracket as reported in STEEL, Oct. 21. German imports are reported to be the most disturbing in the domestic light rail market.

Prospects appear brighter for the inauguration of a large carbuilding program by the Pennsylvania early next year. Approximately 11,000 freight cars are now being contemplated as against 7000 originally and while steel inquiries may be issued before Jan. 1, it is probable that the tonnage, if it actually develops, will fall into next year's business.

Rolled steel requirements for these cars are estimated tentatively at 130,000 tons, with an additional substantial tonnage of cast steel and special parts. Undoubtedly, however, a good number of parts, such as axles, will be reclaimed from existing equipment. Cast steel trucks and center sills will be used, it is believed, at least some of this at the expense of rolled steel. In addition it is understood that at least 100 locomotives will be built.

So far there appears to be nothing official or definite other than the fact that such a program is under contemplation; nevertheless indications are decidedly more favorable than a couple of months ago when the program was first mentioned.

Rail Orders Placed

Norfolk & Western, 10,000 tons; 7500 tons to Carnegie-Illinois Steel Corp., Pittsburgh, and 2500 tons to Bethlehem Steel Co., Bethlehem, Pa.

Wheeling & Lake Erie, 500 tons, to Carnegie-Illinois Steel Corp., Pittsburgh.

Car Orders Pending

Chicago Street Railways, Chicago, 100 street cars, inquiry revived.

National Railway of Mexico, 10 express and 10 mail and express cars of all-steel construction, 70 feet in length; bids asked.

Locomotives Pending

Bureau of supplies and accounts, navy department, Washington, one standard gage gasoline-driven locomotive, delivery San Diego, Calif., bids Nov. 8, schedule 6332.

Rail Orders Pending

Bureau of supplies and accounts, navy department, Washington, 165 tons, with fastenings, for delivery at White Plains, bids Nov. 6, schedule 6251.

Panama canal commission, 1720 tons of 90-pound rail; bids to be opened in Washington, Nov. 4.

Buses Booked

American Car & Foundry Motors Co., New York: Five 30-passenger city coaches for Baltimore Coach Co., Baltimore; twelve 35-passenger city coaches for Worcester Street Railway Co., Worcester, Mass.

Sheets

Sheet Prices, Page 62

Pittsburgh — With specifications for cold-finished sheets steadily advancing, producers last week were unable to name delivery dates much before Nov. 12. Following upon an important sheet purchase by Ford Motor Co., other producers are participating in active buying. Barrel, drum and small tank makers have been fairly heavy buyers of black sheets. The average of all sheet mill operations was a few points higher last week at 70 per cent. Galvanized and common black sheet output was slightly higher than 70 per cent, full finished about 65. Barring weakness in the base price of galvanized sheets through many Southern points and a revival of jobber allowance on galvanized, the price schedule is firm.

Cleveland — Sheet mill operations here and in an adjacent lake district serving the Michigan automobile industry are close to capacity, with backlogs extended two to four weeks on full finished material. A gradual increase is noted in specifications from automobile manufacturers. Demand from washing machine manufacturers is strong; refrigerator manufacturers are specifying regularly, and the steel barrel makers are increasing the number and size of orders. Some good tonnages are in prospect for air-conditioning units.

Chicago—Automotive sheet releases are substantially heavier and increased shipments to that industry help to offset the quieter situation in needs of miscellaneous consumers. Sheet mill operations generally are above 75 per cent and indications point to a maintenance of this rate for the next several weeks. Smaller buyers continue to order conservatively and inventories in most cases are relatively light.

Boston—With larger consumers specifying more freely for advance needs, carload shipments are more numerous. New buying is well sustained. A feature is the wide range in miscellaneous demand with builders of household accessories taking substantial shipments.

New York—Sheet tonnage is being well sustained, with sellers reporting a widely diversified demand. Shipments are in excess of those for the corresponding period of last month. The $2 differential to jobbers on galvanized sheet is being restored in a number of instances, according to reliable reports. This differential was generally eliminated Oct. 1 and there was substantial last minute buying

by jobbers. Some see in the manner in which differentials are being resumed a disposition on the part of the mills taking such action to restrict their differentials to a selected group, with established warehouses and sales facilities.

Philadelphia—While new orders are higher, specifications for sheets are holding up well. Some leading sellers in this district look for the movement this month to top anything so far this year. Bodymakers and radio manufacturers are specifying heavily and, while the stove season is nearing an end, a good tonnage of enameled and plain sheets still is going into this equipment. In addition, there is a good miscellaneous demand, with a fairly impressive amount continuing to move in light construction work. The $2 differential to jobbers on galvanized sheets is being restored by some producers.

Buffalo — Sheet mills here continue to operate at 90 per cent and are heavily booked. Production this quarter promises to surpass any prior period this year.

Youngstown, O.—Reversing what has been the rule here for some months, the sheet mills have taken such an increased amount of business from steel barrelmakers, refrigerator builders and other miscellaneous consumers in addition to automobile partsmakers that valley sheet mills are operating at even better rates than strip mills. Shipping orders are urgent, indicating that a much larger volume of sheets is going directly into consumption. Much of the increased volume of sheet trade is composed of common black sheets, with electrical sheets and other specialties increasing the total.

Cincinnati—Automobile specifications for sheets continue the upward trend accounting in large part for the rise in rolling schedules to about 80 per cent. Other demand, especially for household specialties, is steady at a high level.

St. Louis — Sheet demand is steady. Galvanized material is moving in large volume to manufacturers of utensils and other commodities, also for roofing purposes. During the past several months requirements of the building industry have been more conspicuous than in any similar period in a number of years.

Birmingham, Ala. — Production and shipments are steady. Agricultural sections are consuming large tonnages.

Quicksilver

New York—Quicksilver prices are strong at $74 to $75, a virgin flask of 76 pounds. Supplies continue light, most sellers being out of the market entirely.

Pipe

Pipe Prices, Page 63

Pittsburgh — Small-lot orders for oil country goods and standard pipe have been sufficient to place the rate of operations in producing mills slightly higher, now at 50 per cent of capacity. All discounts and extras on tubular products are firm and without change.

Cleveland — National Tube Co., Youngstown Sheet & Tube Co., and Republic Steel Corp. share in the distribution of 10,000 tons of 8-inch pipe and fittings for a 140-mile line, Crystal, Mich., to Toledo, O., for the Simrall Pipe Line Co., and Standard Oil Co. of Ohio. Simrall is a subsidiary of Standard Oil. This is the largest oil line award in this district in several years. Miscellaneous demand for steel pipe for replenishing jobbers' stocks is fairly steady.

Chicago—Most activity in cast pipe is confined to federally financed projects, but total tonnage involved in orders is light. Pending business usually involves only several hundred tons at a time, but a fairly large number of such inquiries are pending or in prospect. Bids are expected to be asked shortly on a large tonnage for the Milwaukee filter plant, while additional pipe will be required for Chicago sanitary district work.

Boston—Cast pipe buying lags. While projects requiring considerable material have been approved, lateness of the season probably will prevent activity in some sections this year. Improved building outlook has reacted favorably for merchant steel pipe and a steady demand has been slightly improved. Mechanical tubing is also moving fairly well. Wrought pipe demand shows slight gains.

New York—Cast pipe buying continues sluggish. Activity is largely for small fill-in lots with a lack of large size volume. For miscellaneous public works several hundred tons are up. Prices on cast pipe are steady.

Youngstown, O.—Two wrought pipe mills here have benefited from award of 140 miles of 8-inch oil pipe made by the Standard Oil Co. of Ohio. The total pipe tonnage involved in the Standard's project for a line from the Michigan oil fields to Toledo, O., is 8670 tons. The Republic Steel Corp. has taken about 3000 tons of this divided order, the National Tube Co. an equal tonnage, and the Youngstown Sheet & Tube Co. about 2000 tons.

Birmingham, Ala. — Cast pipe shops will maintain 50 per cent operations for an indefinite period, considerable business now being booked.

San Francisco—Bookings of cast pipe are confined to lots of less than 100 tons and few projects were reported placed. To date this year 27,476 tons have been awarded on the Pacific coast as compared with 33,876 tons for the corresponding period in 1934.

Seattle—United States Pipe & Foundry Co., Burlington, N. J., through Hugh G. Purcell, is low bidder for supplying this city 140 tons of 16-inch class 150 cast pipe. Inquiry continues slow although numerous projects are under consideration. LaCenter, Yacolt and Ridgefield, Wash. are planning new water systems. Wrangell, Alaska, has opened bids for 3550 feet of steel water pipe.

Cast Pipe Placed

415 tons, 8 and 10-inch, bureau of supplies and accounts, navy department, delivery east and west yards, to United States Pipe & Foundry Co., Burlington, N. J.

225 tons, PWA waterworks project, Arlington, O., to James B. Clow & Sons, Chicago.

Steel Pipe Placed

10,000 tons, with fittings, 8-inch, 140-mile line, Crystal, Mich., to Toledo, O., for Simrall Pipe Line Co., and Standard Oil Co. of Ohio, divided between National Tube Co., Pittsburgh; Youngstown Sheet & Tube Co., and Republic Steel Corp., Youngstown, O.

Cast Pipe Pending

900 tons, Point Pleasant, N. J.

500 tons, 12-inch, Milwaukee; United States Pipe & Foundry Co., Burlington, N. J., low.

100 tons, 3 and 4-inch, St. George, Utah; bids in.

Tin Plate

Tin Plate Prices, Page 62

Pittsburgh—Tin plate production holds at 50 per cent. Canmakers' spot requirements are rapidly diminishing as the 1935 canning season has practically expired. Not only tin plate producers but canmakers themselves are holding large inventories of tin plate, with the inevitable result that a large quantity will be carried over into 1936. The price of tin plate remains $5.25 per base box, Pittsburgh, and on tin mill sizes of black sheets, 2.75c, Pittsburgh, for 28 gage.

Youngstown, O.—Unexpected revival of activity in the tin plate trade has halted the decline in the rate of tin mill operations in this district to around 55 per cent. Some district tin mills under special conditions are operating at a much higher rate for the time being.

Shapes

Structural Shape Prices, Page 62

New York—New volume coming out for bids is heavier than current awards. With close to 30,000 tons active, already up for figures, or bid, new tonnage is impressive. The bulk of such work, however, is for public works with little upturn in private construction. New York state highway bridge needs are heavier. There is less weakness in fabricated steel prices on the general run of work.

Pittsburgh—Outstanding inquiry includes 2000 tons for depressed track work in New York for New York Central railroad, and 1000 tons in a pipe and structural shop, Charleston, S. C., for the navy. Formal award of the 8000-ton Homestead, Pa., high level bridge is held up pending certain adjustments between the Pittsburgh Railways Co., the Pennsylvania and Pittsburgh & Lake Erie railroads on contributing building costs and assessments. Plain structural shapes remain 1.80c, Pittsburgh, and steel sheet piling, 2.15c, Pittsburgh.

Cleveland—Public work is slow in developing shape tonnages, although with the granting of additional federal money to the state and Ohio communities fabricators are hopeful of a fair degree of improvement this fall. For the Outhwaite federal housing project in Cleveland 200 tons have been awarded, in addition to 1100 tons of reinforcing bars. Fewer plant rehabilitation jobs have apppeared recently.

Chicago—Structural awards continue insignificant, while new inquiries also are light, being made up principally of small bridges. Great Lakes Dredge & Dock Co. is expected to receive the general contract for the Peoria, Ill., lock involving 1500 tons of shapes and permanent piling.

Boston—Inquiry has improved materially, schools especially indicating heavier demand for structurals during the remainder of the quarter. A New York contractor is low on a Providence, R. I., school, taking 1200 tons. Boston & Albany railroad will build a retaining wall around three piers, Hoosac tunnel docks, taking several thousand tons of steel piling.

St. Louis—Fabricators of structural steel report small awards sufficient to maintain their operations at about 40 per cent, equal to the best rate this year. Bids will be opened by the Missouri highway commission Nov. 8 for a bridge over the Missouri river at Weldon Springs, the project requiring 4923 tons of structural steel.

San Francisco—More grade crossing projects are coming out for figures. Bids open on Nov. 6 for 483 tons for a crossing at El Cerrito, Calif., and on 329 tons for a crossing at Salinas, Calif. The metropolitan water district, Los Angeles will open bids Nov. 14 for pumping units requiring 900 tons or more.

Seattle—Inquiry continues active, although there is practically no private work except in small tonnages. Subcontracts are pending for the 420 tons involved in the Bonneville, Oreg., power house. Puget Sound navy yard has rejected tenders for 100 tons of steel sheet piling and girder beams.

Shape Contracts Placed

5700 tons, Manhattan approach to Triboro bridge, New York, contract No. 48 to American Bridge Co., Pittsburgh; through Corbetta Construction Co., New York.

1500 tons, Randalls Island junction Triboro bridge, New York, to Harris Structural Steel Co., New York; through Poirier & McLane Co., New York.

400 tons, building, Eastman Kodak Co., Rochester, N. Y., to Genesee Bridge Co., Rochester.

310 tons, mail and service building, Syracuse, N. Y., for New York Central railroad, to Shoemaker Bridge Co., Pottstown, Pa.

300 tons, Oklahoma state bridges, to Capitol Steel & Iron Co., Oklahoma City, Okla.

215 tons, Pennsylvania state bridge Centre and Clinton counties, route 219, through the Graham Construction Co., Lancaster, Pa., to Fort Pitt Bridge Works, Pittsburgh.

200 tons, Outhwaite federal housing project, Cleveland, to Ingalls Iron Works Co., Verona, Pa.

180 tons, addition to mill building, Lowellville, O., for Sharon Steel Hoop Co., Sharon, Pa., to Pittsburgh Bridge & Iron Co., Rochester, Pa.

180 tons, repairs, Williamsburg bridge, New York, to McClintic-Marshall Corp., Bethlehem, Pa.

175 tons, bridge, Mazomanie, Wis., to Vierling Steel Works, Chicago.

175 tons, studio building, Detroit, to Whitehead & Kales Co., Detroit.

160 tons, state highway bridge, Arapahoe, Nebr., to Omaha Steel Works, Omaha, Nebr.

150 tons, sound stage, United Artists Studio Corp., Los Angeles, to Consolidated Steel Corp., Los Angeles.

150 tons, state bridge, Quilcene river, Washington, to Pacific Car & Foundry Co., Seattle.

120 tons, garage framework, Puget Sound, Wash., navy yard, to Pacific Car & Foundry Co., Seattle.

150 tons, conservatory in Forest Park, St. Louis, to LaSalle Iron Works, St. Louis.

145 tons, women's building, University of Arizona, Tucson, Ariz., 62 tons of structurals to Midwest Steel & Iron Works Co.; 28 tons of bar joists, Colorado Builders Supply Co., Denver, and 55 tons, reinforcing, Truscon Steel Co., Youngstown, O.; M. M. Sundt Construction Co., Tuscon, Ariz., general contractor.

110 tons, postoffice, Mineola, New York, to Berkshire Structural Steel Co., Brooklyn, N. Y.; through A. J. Paretta Contracting Co., Long Island City, N. Y.

100 tons, building for Gladding McBean Co., Los Angeles, to Consolidated Steel Corp., Los Angeles.

100 tons, bridge on State street, Salt Lake county, Utah, to unnamed interest.

100 tons, bridge, Fort Seward, Calif., to unnamed interest.

100 tons, brewery, Philadelphia, to American Steel Engineering Co., Philadelphia.

Shape Awards Compared

	Tons
Week ended Oct. 26	**10,721**
Week ended Oct. 19	**16,100**
Week ended Oct. 12	**26,170**
This week, 1934	**14,183**
Weekly average, 1934	**16,284**
Weekly average, 1935	**18,321**
Weekly average, September	**16,725**
Total to date, 1934	**730,262**
Total to date, 1935	**706,146**

Shape Contracts Pending

4923 tons, state bridge, Weldon Springs, Mo.; bids Nov. 8 to Missouri highway commission.

2500 tons, Andrew Jackson high school, Springfield, Queens, N. Y.; George F. Driscoll Co., New York low on general contract, bids Oct. 21; board of education, New York.

1500 tons, including 1200 tons of piling, Illinois river lock near Peoria, Ill.; Great Lakes Dredge & Dock Co., Chicago, low for general contract.

1200 tons, Mt. Pleasant street regional high school, Providence, R. I., C. T. Wills Inc., New York, low on general contract. Project also takes about 300 tons of reinforcing bars.

1000 tons, public school 107, Seward avenue, Bronx, N. Y., Walter Kidde Construction Inc., New York, low on general contract.

1000 tons, structural and pipe shop, navy yard, Charleston, S. C.

900 tons, specifications 133, metropolitan water district, Los Angeles, pumping units; bids Nov. 19.

750 tons, armory, Schenectady, N. Y.

650 tons, Jute mill, Ludlow Mfg. Co., Edge Moor, Del.; bids opened.

650 tons, dam, tidal power project, Eastport, Me.

500 tons, state bridges, Wisconsin; bids Oct. 29.

500 tons, Lyons bridge, Baraboo, Wis.; bids Oct. 29.

483 tons, crossing at El Cerrito, Calif.; bids Nov. 6.

425 tons, bridge, Hand Mich.

400 tons, subway, Third avenue, New York, for New York Central railroad.

395 tons, schedule 3097, Panama Canal; bids Oct. 28.

350 tons, postoffice, Tallahassee, Fla.; H. W. Beers, Atlanta, Ga.; general contractor.

329 tons under crossing, Salinas, Calif.; bids Nov. 6.

300 tons, state bridges, Missouri.

300 tons, high school, Newburyport, Mass.; bids Oct. 31.

300 tons, public school 247, twenty-first avenue, Brooklyn, N. Y.; Jonwal Construction Co., New York, low on general contract.

250 tons, estimated, Northeast high school addition, Philadelphia.

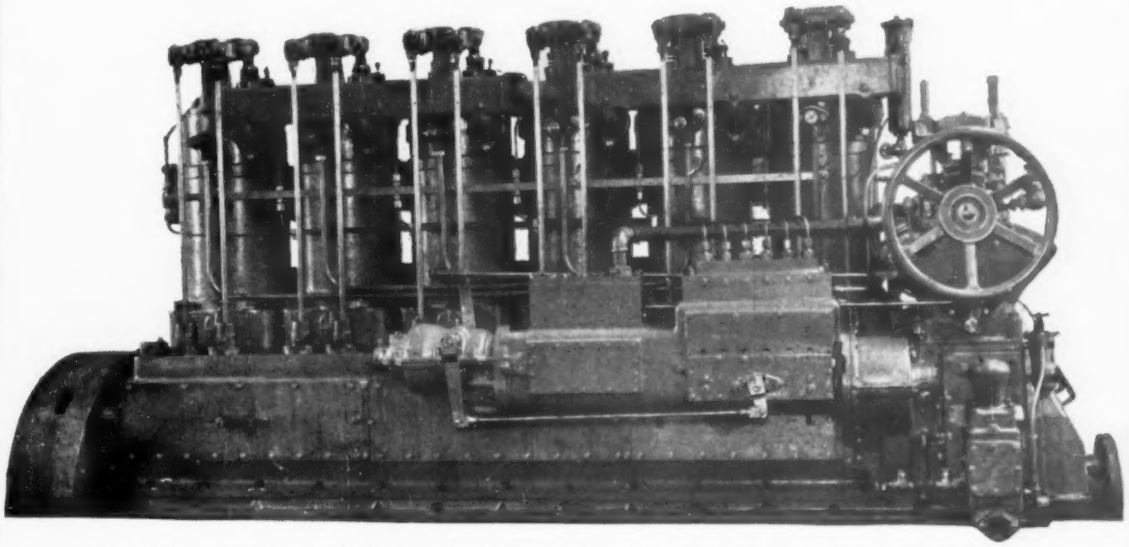
228 tons, bridge, Peoria county, Illinois; bids Nov. 1.

200 tons, housing project, Milwaukee.

125 tons, postoffice, Fond du lac, Wis.; J. P. Cullen & Son, Janesville, Wis., general contractor.

Since 1929

Wolverine Diesels have Crankshafts of CHROMIUM-VANADIUM Steel



6-cylinder, 4-cycle, 9-inch bore and 14-inch stroke air-reverse marine Diesel engine, built by Wolverine Motor Works, Bridgeport, Conn. The Crankshaft is Chromium-Vanadium Steel.

VANCORAM BRAND

FERRO-ALLOYS
of vanadium, silicon, chromium, titanium, and silico-manganese, produced by the Vanadium Corporation of America, are used by steel makers in the production of high-quality steels.

In the Wolverine Diesel . . . a marine engine characterized by the use of alloy steels in intake valves, base columns, cylinder head, main bearings and other vital parts . . . the crankshaft is Chromium-Vanadium Steel.

Chromium-Vanadium Crankshafts have been used on Wolverine Diesel engines since 1929. The high anti-fatigue properties of Chromium-Vanadium Steels, its high torsional elastic limit and its superior resistance to dynamic stresses assure the dependability so essential in Marine engines.

If the performance of your product is dependent upon the fatigue resistance of a steel part . . . if a tougher, longer-lived steel will reduce your production costs . . . Metallurgists of the Vanadium Corporation of America will be glad to help you select steels that will meet your requirements.

•

VANADIUM CORPORATION OF AMERICA
120 BROADWAY, NEW YORK, N. Y.

CHICAGO PITTSBURGH *Bridgeville, Pa.* DETROIT

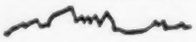
Plants at Bridgeville, Pa., and Niagara Falls, N. Y.
Research and Development Labs., Bridgeville, Pa.

VANADIUM STEELS

for strength, toughness and durability

THE ARC THAT SHOWS UP IN THE SHOW DOWN

You'll find out more about arc welder performance from the oscillograph record than you can learn otherwise in a month of Sundays.

When it looks like this: 
you have the varying heat intensity that means lack of uniform strength in welds.

P&H-Hansen's oscillograph record looks like this:
That's why you weld faster, more effectively with P&H-Hansens. They make welding easier, reduce the dependence on human skill.

Before you buy your next welder, examine comparative oscillograph recordings. You will find the key to strong dependable welds.

HARNISCHFEGER CORPORATION
4411 W. National Ave., Milwaukee, Wis.

Bulletin HW-3 gives you "The Inside Story". Ask for it.

Models range from 50 to 800 ampere capacity.

P&H HANSEN ARC WELDERS

110 tons, bridge, Henry county, Illinois; bids Nov. 1.

100 tons, tunnel ribs, bid 45618, metropolitan water district, Los Angeles; Youngstown Steel Car Corp., Niles, O., low.

Unstated tonnage, one 250-foot span and three shore spans, proposed highway bridge across the Mahoning river at Edinburg, Pa.; public hearing to be held Oct. 23 at New Castle, Pa., on approval of plans.

Unstated, Clearwater river state bridge, Idaho; J. K. Konen, Lewiston, Idaho, low.

Unstated, state overhead crossing, Snohomish county, Washington; Wilder & Montfort, Blaine, general contractors.

Unstated, state steel girder undercrossing, Spokane, Wash.; bids at Olympia, Nov. 5.

Unstated, two 300-ton traveling electric cranes, lifting beams, supports, etc., for Bonneville, Oreg., dam project; bids to United States engineer, Portland, Oreg., Nov. 6.

Unstated, tainter gates, hoists, gantry crane, lifts, frames, track rack materials etc., for Spokane, Wash.; bids Nov. 14.

Unstated, station control works, powerhouse, steel sheet piling and installing 320 tons machinery and shapes for Spokane, Wash.; bids Dec. 5.

Reinforcing

Reinforcing Bar Prices, Page 63

New York—Reinforcing steel buying is heavy, although with the placing of 6000 tons for the Randall's Island junction, Triboro bridge, New York, last week, total awards are smaller. More contracts have been placed, however, notably for highway mesh. On the larger projects prices are weak, contractor buyers securing reductions of $4 and $5 a ton under listed quotations. Inquiry is heavy with planned work even more impressive.

Pittsburgh — Holmes Construction Co., Wooster, O., low on Oct. 18 to the Pennsylvania state highway department for Wyoming county, Pennsylvania, work, will require 69,000 pounds of plain steel reinforcing bars. Tyler & Cole, Meshoppen, Pa., is low at $135,206.31 for state highway work in Luzerne coun-

Concrete Awards Compared

	Tons
Week ended Oct. 26	6,924
Week ended Oct. 19	10,246
Week ended Oct. 12	11,675
This week, 1934	2,235
Weekly average, 1934	4,084
Weekly average, 1935	6,792
Weekly average, September	28,497
Total to date, 1934	200,039
Total to date, 1935	298,846

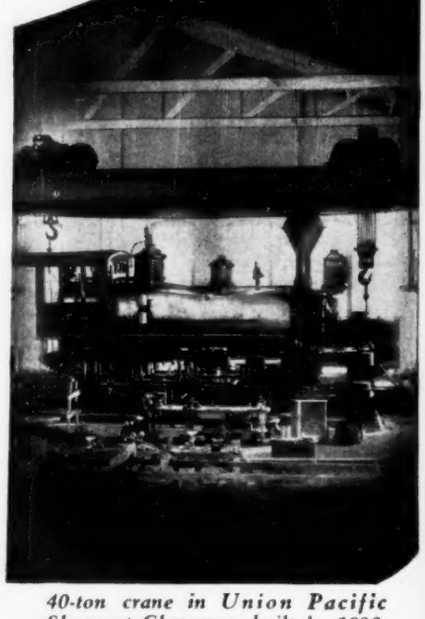
MORE THAN 45 YEARS ON THE JOB ... the first one we ever built!

It's the first of its kind ever completely built in the Harnischfeger shops where the trimotored electric crane was pioneered. 45 years on the job and still going strong!

Since then we've learned a heap about building cranes to meet the demands of American industry. You can't find a crane problem that P&H engineers haven't already licked. That's why, as America's foremost builder, P&H has the experience and facilities to give you what you need . . . when you need it.

HARNISCHFEGER CORPORATION
4411 W. National Ave., Milwaukee, Wis.

Catalog 450 tells the story of P&H Crane Construction. Write for it.



40-ton crane in Union Pacific Shops at Cheyenne; built in 1890.

P&H TRAVELING CRANES

ty, Pennsylvania, on Oct. 18 bids. This project requires 37,381 pounds of plain steel bars.

Cleveland — Featuring the market here is the award of 1100 tons of rail steel reinforcing bars for the Outhwaite federal housing project, and 1100 tons for the Whisky Island housing project, both to Truscon Steel Co., Youngstown. The general market is quiet, and prices in some instances are easier.

Chicago — Concrete bar distributors are figuring a smaller tonnage of business than has been true for several months. Private work is limited almost entirely to individual lots of less than 100 tons and the number of these has declined. Public work predominates, though inquiries for highway and grade crossing construction have increased less rapidly than was anticipated. Illinois has opened bids on 700 tons for bridges, while 375 tons is pending for the Peoria, Ill., lock.

Boston — Outlook for reinforcing steel volume is improved by more active construction work which will be bid shortly, notably schools. Active pending inquiry is up slightly, but buying is light and mainly in small lots.

Philadelphia—While several fair-size jobs are active and future prospects are more encouraging, actual bar awards here over the past week have been light. Should federal housing work now under contemplation in this district go ahead a substantial tonnage of bars will be required; however, a recent ruling by Comptroller General McCarl that PWA cannot pay municipalities for fire and police protection and other public services, may serve to check this type of work. Billet steel bar prices continue to show greater stability.

San Francisco—Bids were opened last week by the metropolitan water district, Los Angeles, for a pipe line, which, if precast pipe is used will require 16,850 to 22,350 tons of reinforcing bars. If cast-in-place pipe is specified the district will furnish 20,818 tons, and will purchase it at a later date. Awards exceed 4600 tons and brought the aggregate for the year to 193,110 tons, compared with 92,880 tons a year ago. The general contract for barracks and mess hall for the air fleet base at Pearl Harbor, T. H., involving 620 tons, has been placed with R. E. Wooley, Honolulu, at $563,000.

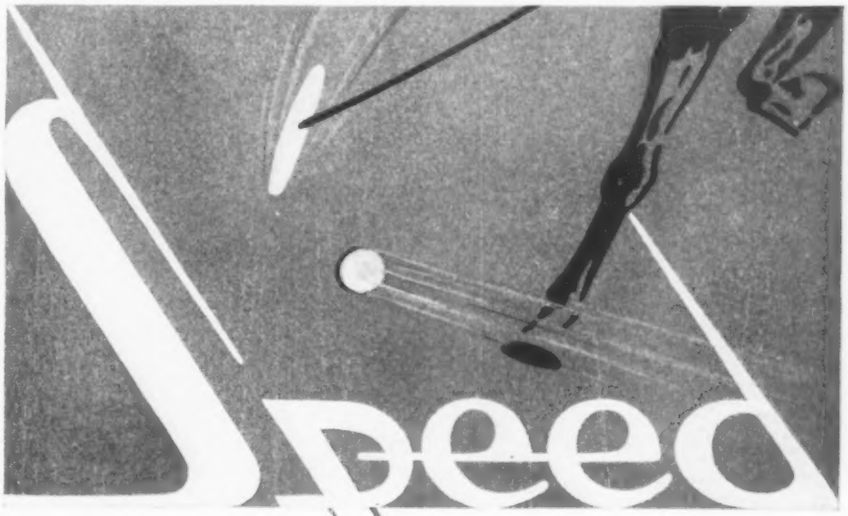
Seattle—Demand is improving as public projects get under way. No award has been made as yet for the 3500 tons for the fishways at the Bonneville, Oreg. dam. American Concrete Pipe Co., Tacoma, Wash., is low bidder for 7290 feet of 42-inch water pipe at Tacoma, requiring concrete bars.

Unit Bids on 6000-Ton New York Bridge

Randalls Island Junction, Triboro Bridge, New York City, Opening Oct. 10. All Bidders New York Contractors

	Quantities in tons	Unit price per pound in place				
		Poirier & McLane Co.	J. Leopold & Co.	Corbetta Constr. Co.	P. T. Cox Cont. Co.	Cornell Cont. Co.
Reinforcing steel.....	5,750	4.00c	5.00c	4.00c	4.60c	5.40c
Reinforcing trusses..	48,000 ft.	50.00c ft.	57.00c ft.	30.00c ft.	30.00c ft.	35.00c ft.
Carbon struc. steel..	750	4.50c	5.00c	4.50c	4.70c	5.50c
Silicon struc. steel..	255	5.20c	6.00c	5.20c	5.00c	6.60c
Cast steel	10½	10.00c	10.00c	10.00c	8.00c	11.00c
Misc. steel, iron and railing in drainage system	245	17.00c	10.00c	14.00c	15.00c	19.00c

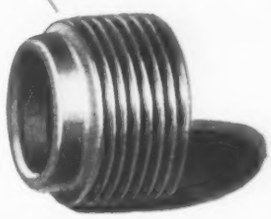
General contract awarded to Poirier & McLane Co., at $2,144,830. Rawlins Steel Co., New York, was awarded reinforcing steel and reinforcing trusses, as previously reported in STEEL.



POLO is a fast-moving game that calls for a finely balanced combination of quick thinking and hard riding—a man with nerves of steel, and a horse with the courage of a thoroughbred.

Whether in polo playing or in steel working, the prime factor is *time*. Speed is what counts in making goals on the field, or in making parts on an automatic screw machine. Ultra-Cut Steel is a "ten goaler" at this job and is groomed for speed like a thoroughbred.

It behaves beautifully under the tool, producing clean-cut threads, smooth machined surfaces, flawless finished parts—and at a production rate of 30% to 40% higher than with ordinary free-cutting screw stock.



This threaded reducer was machined at the rate of 103 pieces per hour, using Ultra-Cut Steel, versus 60 pieces per hour with SAE 1112 screw stock, resulting in finer finish and fewer tool grinds.

BETTER MADE STEELS LABORATORY TESTED

WRITE FOR ULTRA-CUT FOLDER No. 3-S, which describes other performances of this high speed screw stock.

Cold Drawn Bars and Shafting ● Extra Wide Flats ● Special Sections ● Alloy Steels

BLISS & LAUGHLIN, INC.

HARVEY, ILL. *Sales Offices in all Principal Cities* BUFFALO, N.Y.

Reinforcing Steel Awards

3400 tons, power house and fish ladder, Bonneville dam, Oregon, to Pacific Coast Steel Corp., San Francisco.

1100 tons, rail steel, Outhwaite federal housing project, Cleveland, to Truscon Steel Co., Youngstown, O.; project also takes 200 tons of miscellaneous structural items.

1100 tons, rail steel, Whiskey Island federal housing project, Cleveland, to Truscon Steel Co., Youngstown, O.

165 tons, Meredosia, Ill., to Laclede Steel Co., St. Louis.

164 tons, state crossing in Lewis & Clark county, Montana, to unnamed interest.

160 tons, library, University of Oregon, Eugene, Oreg., to Truscon Steel Co., Portland, Oreg.

150 tons, 50,000 linear feet, reinforcing trusses, Randall's Island junction, Triboro bridge, New York, to Rawlins Steel Co., New York. Poirier & McLane Co., New York, general contractor. This material in addition to approximately 6000 tons awarded the same seller and reported in STEEL, Oct. 21.

150 tons, state liquor warehouse, Helena, Mont., to Northwest Steel Rolling Mills, Seattle.

135 tons, postoffice, Chester, Pa., awarded through Nicholas Engineering Co., 1500 Locust street, Philadelphia, to an unnamed seller.

100 tons, bridges at Glacier Park and Shelby, Mont., to Northwest Steel Rolling Mills, Seattle.

100 tons, addition to Los Angeles Turf club building, Arcadia, Calif., to unnamed interest.

100 tons, warehouse, Veeder-Root Co., Hartford, Conn., to Concrete Steel Co., New York.

100 tons, state road work, Illinois, to Concrete Engineering Co., Chicago.

Reinforcing Steel Pending

1100 tons, San Pablo avenue crossing, Oakland, Calif.; general contract to J. F. Knapp, San Francisco.

1000 tons, building, Continental Can Co., Chicago; Austin Co., Cleveland, general contractor.

755 tons, placing, pumping units, specification 133 metropolitan water district, Los Angeles; bids Nov. 19.

700 tons, Illinois state bridges; bids closed.

620 tons, barracks and mess hall, air fleet base, Pearl Harbor, T. H., Specification 7474; general contract to R. E. Wooley, Honolulu, at $563,000.

500 tons, crossing at El Cerrito, Calif.; bids Nov. 6.

375 tons, Illinois river lock near Peoria, Ill.; Great Lakes Dredge & Dock Co., Chicago, low for general contract.

250 tons, bridge, Providence, R. I.; bids in.

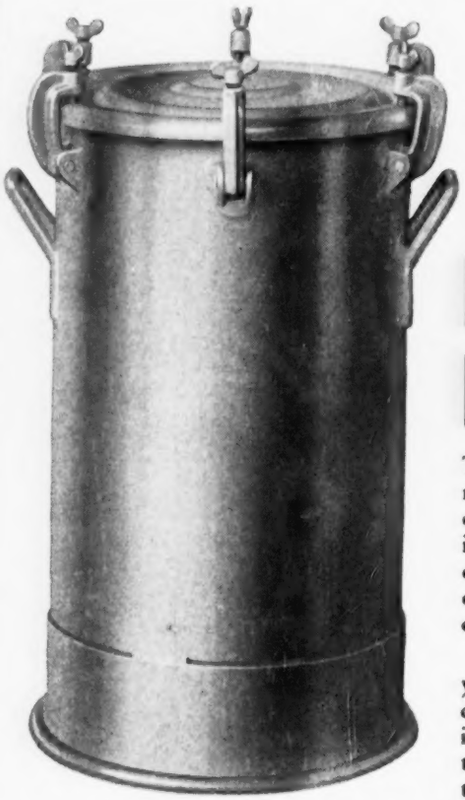
250 tons, federal court house, Buffalo, John W. Cowper Co., Buffalo, general contractor.

162 tons, concrete beam bridge, Blair and Huntingdon counties Pennsylvania; bids Nov. 8.

111 tons, state highway work in Kern and Los Angeles counties, California; bids Nov. 6.

Unstated, reinforced girder overcrossing at Spokane, Wash.; bids at Olympia, Nov. 5.

Unstated, concrete pipe, Tacoma, Wash.; American Concrete Pipe Co., Tacoma, low.



SPECIAL SHELLS, SHAPES, TANKS, BOTTLES, ETC.

DEEP-DRAWN

This example of the Hackney cold drawing facilities is only one of many. The shell is seamless with outwardly curled open edge. Formed ears are welded to side of container.

Hackney, with over 30 years experience, is serving countless companies requiring special shells, shapes, tanks, bottles, etc. Advantages of the cold drawing method include: Smooth surface inside and out, that permits a fine painted finish. Freedom from laminations in the metal. Uniformity of temper and thickness.

Generally, a seamless shape can be formed. Where welding is advisable, the special Hackney method assures good appearance and uniform strength.

We suggest sending blue prints or specifications of your requirements in special shapes. Possibly Hackney can be of service.

PRESSED STEEL TANK COMPANY

208 S. La Salle St. Bldg., Room 1121 Chicago
6661 Greenfield Ave., Milwaukee, Wis.
1387 Vanderbilt Concourse Bldg., New York
688 Roosevelt Bldg., Los Angeles, Calif.

Hackney
MILWAUKEE

DEEP DRAWN SHELLS AND SHAPES

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 63

Active buying of bolts and nuts late in third quarter has slowed current demand from many users. Jobbers and railroads are taking little. At Chicago agricultural implement builders are taking steady requirements.

At Cleveland demand appears to be leveling off, with orders so far this month about 5 per cent ahead of the comparable period in September. Fifty per cent of the current volume is coming from automobile interests, and in other lines there is a slackening tendency.

Milton Mfg. Co., Milton, Pa., is low at $1272.50, plant, for furnishing 1100 1⅛ x 5½-inch forged steel bolts complete with nuts, 5560 1½ x 5¼-inch bolts, 360 1½ x 5½-inch bolts, and 460 1½ x 5¾-inch bolts for dredge pipe and fittings in connection with the Fort Peck dam dredges on which bids have just been opened.

The 75 off list market on bolts and nuts and 2.90c Pittsburgh and Cleveland, 3.00c, Chicago, on large rivets continue to be observed. Small rivets hold at 70-5 off list.

Wire

Wire Prices, Page 63

Pittsburgh—Buyers of plain manufacturing wire and spring wire continue to pay the base of 2.30c and 2.90c, Pittsburgh or Cleveland, respectively, for their requirements, which are still in steady volume. Requirements of bolt and nut manufacturers are slightly heavier and there has been more buying by makers of numerous spring specialties. Orders from the rural jobbing trade, however, are less inasmuch as jobbers' and distributors' stocks are adequate for late fall farm demands. Nails are $2.40 per keg, Pittsburgh or Cleveland. Barbed wire and galvanized fence wire are both quoted 2.80c. Woven wire fencing remains $58 per base column.

Cleveland — Demand for manufacturers' wire is noticeably slower, after several weeks of substantial shipments to nut and bolt manufacturers and jobbers. Tonnage so far this month is slightly less than in the comparable period in September. Farm buying is quieter.

Chicago—Wire continues one of the most active of finished products, with business moderately heavier than in September. Automotive releases are gaining, and demand for merchant products in farm areas is expanding. Manufacturers' wire shipments are well diversified, though buyers generally are ordering only for early requirements. Prices continue steady.

Boston — Incoming volume of specialties and manufacturer's wire continues heavy and mills have difficulty in meeting delivery demands, buyers placing business late and asking immediate shipment. Heavier merchant wire products are not active, but total volume in this district is fairly steady. In some departments mills are operating full schedules. Prices are firm and unchanged at 2.40c, Worcester, for manufacturers' wire.

Strip Steel

Strip Prices, Page 63

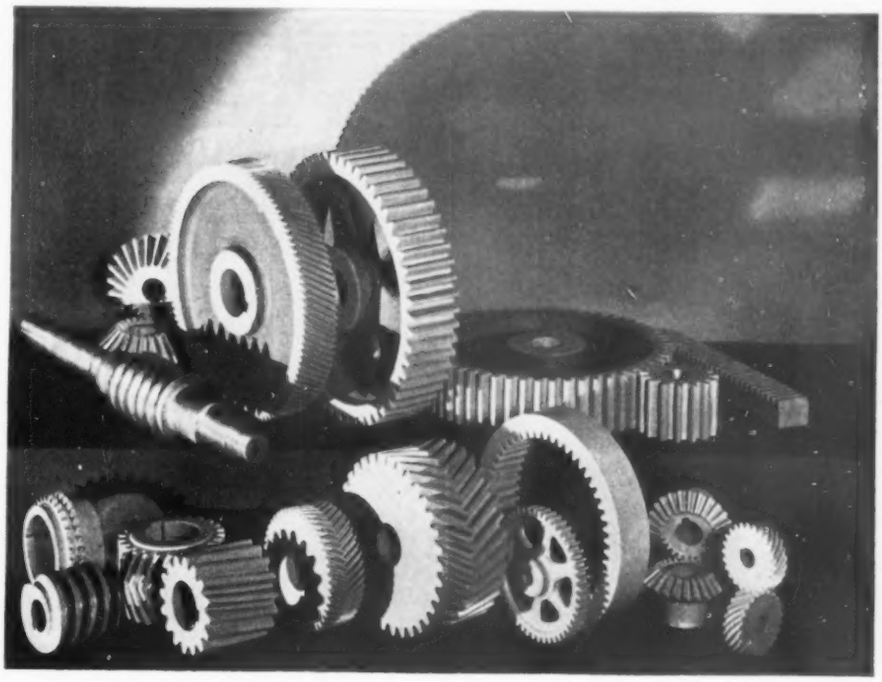
Pittsburgh — In efforts to build up automobile hardware inventories, automobile manufacturers have been heavy specifiers of stainless steel strip over the past week bringing the question of delivery into prominence. Hot-rolled strip steel remains quoted 1.85c, Pittsburgh, and the cold-rolled base holds at the usual $15 a ton spread, or 2.60c, base, Pittsburgh or Cleveland. Among producers of strip last week, operations were steady, finding hot-rolled at 45 per cent and cold-rolled at 50-55 per cent.

Cleveland—Strip steel specifications were moderate during the week, with the Cleveland mill operating at 50 per cent. Automobile releases showed little change in volume.

Boston—Cold-rolled strip buying holds at least to the recent brisk rate, some mills noting a slight increase. Demand is widely diversified with several industries seasonally active, notably household appliances and holiday specialties. More advance buying by some consumers has resulted in heavier backlogs with several producers. Hot strip is active at about the recent pace. Cold strip prices are steady at 2.80c, Worcester, Mass., with little pressure for concessions.

Chicago — Better automotive activity has stimulated shipments of cold-rolled strip and a fair movement in that direction is in prospect for the larger portion of this quarter. Specifications from miscellaneous users of hot and cold-rolled material have tended downward slightly.

New York—Tonnage of steel strip



"HARD-DUR" STEEL GEARS
preserve the tooth form . . .

● When gears are in operation, tooth pressure tends to destroy the involute curve and as this wear progresses the gears no longer run efficiently.

Horsburgh & Scott "HARD-DUR" gears not only have involute teeth that are produced to very high standards of accuracy by very careful and painstaking workmanship, but the material is highly wear resistant. In fact, "HARD-DUR" gears possess strength, hardness and wearing qualities so much greater than similar untreated gears that they are guaranteed to have four to five times the life at a cost of only about 50% extra. Their economy is quite apparent.

A 448 page Gear Book is yours for the asking.

THE HORSBURGH & SCOTT CO.
GEARS AND SPEED REDUCERS
5112 HAMILTON AVENUE, CLEVELAND, OHIO, U. S. A.

is expanding to what probably is the highest point for this year. Automotive accessory manufacturers and holiday novelty plants are taking substantial tonnages

Youngstown, O.—The automotive trade continues to furnish most of the sustained demand for cold-rolled strip, especially narrow widths. Hot-rolled continues in fair demand in the wider widths.

Philadelphia — Strip demand is at least being sustained at the improved rate of the past few weeks. Radio manufacturers appear to be consuming the largest quantities. Prices are unchanged at 1.85c, Pittsburgh, or 2.16c, Philadelphia, for hot-rolled and 2.60c, or 2.91c, for cold-rolled.

Cold Finished

Cold Finished Prices, Page 63

Pittsburgh—The cold-finished bar market has been showing a significant gain in specifications. Other cold-finished bar consuming industries show little change in their rate of buying. Shipments this month will exceed those of September by a wide margin. This condition is due to specifications driven in before the Oct. 1 change in extras. The market is firm at 1.95c, Pittsburgh.

Pig Iron

Pig Iron Prices, Page 64

Pittsburgh—Pig iron users, buying on a Pittsburgh district furnace base, have been advised that the $1 a ton advance in the market will not take effect probably until Dec. 1, or even Jan. 1, 1936. Under these circumstances, the advance initiated at Chicago last week will give local melters adequate time to stock. Since Pittsburgh furnaces will follow Chicago, the parity on pig iron base prices at all of the mid-western basing points eventually will not be disturbed.

Cleveland—Reflecting the advance of $1 a ton in pig iron at Chicago, a stronger tone is apparent in the market here, although quotations had not been changed up to last Saturday. However, it is believed to be only a matter of a few days at most before similar advances will be announced here and elsewhere. Meanwhile, melters have taken advantage of the opportunity to close for their requirements and large tonnages have been booked. Sellers say they have not booked any material for shipment beyond this quarter. Shipments continue to increase, and for the month may be 40 per cent or more over the September rate.

National Tube Co., Lorain, has lighted its third blast furnace.

Chicago—Pig iron prices have been advanced $1 a ton to $19.50, Chicago, for No. 2 foundry and malleable, $19 for basic iron and $20 for bessemer. This is the first advance since April a year ago when a similar increase was instituted. The latest upturn had been anticipated by consumers who have covered needs in most cases through the balance of the year, and in some instances into the succeeding quarter. Foundry operations also have been rising, however, aided by heavier automotive operations.

Boston—Pig iron sales have declined slightly, with the exception of a 500-ton purchase of 2.75-3.25 per cent silicon by a textile machinery consumer. Most volume is now in small lots and the mild anticipatory buying movement earlier in the month has subsided. Foundries have stocks for needs immediately ahead, but with conjecture as to a price advance for first quarter more convincingly substantiated, heavier purchasing would develop.

New York—Pig iron buying has

Behind the Scenes with STEEL

Fodder for P.A.'s.

NOT being particularly busy over the week-end, we took home a copy of STEEL and spent Sunday counting up the number of price quotations published in the Oct. 21 issue. Weary and haggard, about midnight we totaled up figures on several reams of paper and discovered, barring faulty arithmetic, 1433 separate and distinct quotations, ranging all the way from pig iron No. 2X eastern del. Philadelphia, at $20.68 per ton, to Spanish North African basic iron ore, 50 to 60 per cent, at 10.50 cents per unit f.a.s. Atlantic ports (nominal).

Every week this mass of figures is corrected to Friday night, to be eagerly scanned by administrative and purchasing executives on Monday morning. It takes a fast-working and thorough corps of field correspondents and editors to insure the accuracy and dependability of these quotations. And don't think our editors aren't jumped on when they miss a figure (it happens in the best of families).

An eastern supplier recently wrote in concerning what he thought was an error in our quotations on cap screws. One phrase in his letter struck our promotional eye: "In view of the fact that your quotations are *carefully* scanned by purchasing officials every Monday, may we suggest, etc."

A keg of nails or a carload of pig iron, STEEL tells you what it costs.

* * *

Temblors

HOW do welded steel pipelines stand up under the effects of 260 earthquake shocks? There's a question which many readers of STEEL *would like a report on. Speedy telegraphic inquiry and response supplies it to you, direct from headquarters; see page 40.*

* * *

Best Wishes

THAT new department in STEEL, titled *Power Drives*, now in its fifth week, is eliciting much favorable comment from readers.

An engineer of tests and construction in the plant of an eastern electrical manufacturing company writes: "Your new section, *Power Drives*, is of great interest and will be carefully watched by myself and many others."

Graciously offering to lend our editors the benefit of his experience with this subject, he concludes "with best wishes for a long and useful career for this new section."

The ability and experience of several keen engineers in the mechanical power transmission field are being poured into this new department. Watch it for hints which may save you money on your drive problems. This week, p. 36.

* * *

Acetyleners

GET set for another gala issue next Monday, when STEEL will present complete advance information on the convention of the International Acetylene association in Cleveland, which opens Nov. 18. The welding and cutting boys are doing startling things

these days in developing new applications for their processes. The association convention will bring much of this work to light. We recommend attendance.

* * *

Yearbook

LOOKING still further ahead, to Jan. 6, 1936, we can even now discern a "bigger and better than ever" *Yearbook of Industry*, No. 1 issue of Volume 98. We have had a preview of editorial plans for this issue and they look superb.

As usual, the *Yearbook* will present a complete picture of industrial progress during 1935, a review of foreign and domestic markets and an authoritative appraisal of the year's news in the iron and steel and metalworking industries. All cleverly arranged and strikingly illustrated. Don't miss it!

* * *

Churl

ONE who calls himself Mr. A. Boone Dockler postcards from Appleton, Wis., concerning the anaesthetic properties of Wisconsin brew and other trivialities. Come out from behind that bierstube, sir, we know you!

—SHRDLU

been stimulated by possibility of early advance of $1 a ton in price. Increases in the middle west may be reflected here momentarily, it is believed. Much of the present tonnage being booked is at the expense of first quarter business.

Philadelphia—Sales of pig iron have increased substantially due to probability of eastern producers following action of midwestern sellers in marking up prices $1 per ton. Since deliveries will not have to be taken earlier than December, consumers can afford to cover freely on tonnage for next quarter, it is pointed out. In view of rising production costs, consumers have expected price increase, if not now then at least by Jan. 1. Whether foreign sellers will lift prices in event of general increase remains a matter of speculation.

Buffalo—It is believed Buffalo pig iron prices will be advanced shortly. Sales have been heavy in anticipation of this development.

Youngstown, O. — Pig iron sales here continue to pick up as foundries, both gray iron and malleable, become more active in this market. Shipments also are improved and total tonnage now on books of furnace interests is beginning to assume some old-time proportions. No change in prices for either northern or southern pig iron has been announced here as yet. The Struthers, O., stack of Struthers Iron & Steel Co., still is out of production. No. 4 stack at Ohio works of Carnegie-Illinois Steel Corp. was lighted last week, making three stacks active out of six at that plant. Republic Steel Corp. has a stack ready at Haselton to relight when needed.

St. Louis—Reports of a price increase of $1 per ton have caused another spurt in pig iron purchasing. Shipments are continuing at a high rate, and in numerous instances reflect actual need for the iron. Stove foundries are still accounting for a large part of the current melt. Their operations are at the highest point for this season since the beginning of the depression. Movement of foundry coke also is well sustained.

Cincinnati—Buying of pig iron increased on reports of a price increase in the Chicago district. Quotations for the present are unchanged here. Tonnage of speculative puchases was undetermined, but there is probability the movement in the remainder of this quarter will be at a higher level than in several years.

Birmingham, Ala.—Spot business predominates, aggregate tonnage being satisfactory. Seven blast furnaces continue in production. Coal and coke supplies are holding up well, though the strike of miners is in its fifth week.

Toronto, Ont.—Merchant pig iron sales continue to expand. The daily melt is nearing 50 per cent.

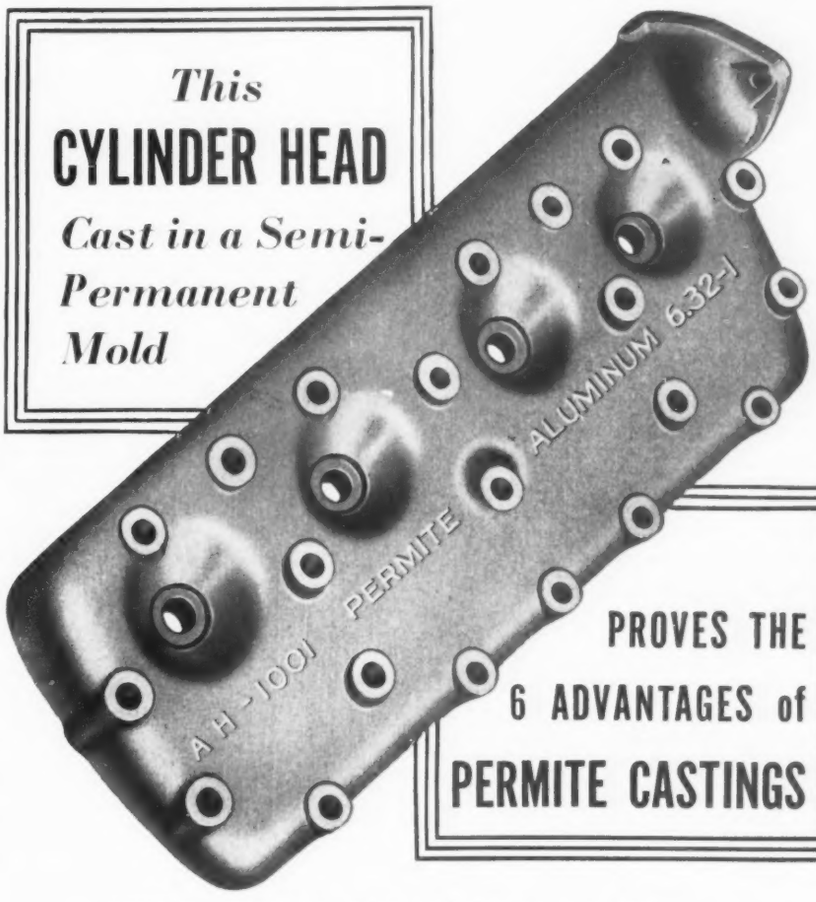
Scrap

Scrap Prices, Page 65

Pittsburgh—The presence of scattered small lots of distress scrap and the ability of two district mills here to purchase a few thousand tons at $13.50 and $13.25, respectively, forced the No. 1 heavy melting steel market down 50 cents a ton last week to a quotable range of $13.00 to $13.50. Other open-hearth grades and specialties were affected in proportion. Only the aforementioned two district mills are buying though the market may turn about overnight if a downriver mill, whose scrap inventory is dwindling, enters the market.

Cleveland — Scrap transactions here continue to present a variegated picture. In the foreground remains the deadlock between buyers and sellers, with important consumers of heavier lines of steel scrap refraining from adding to stocks. Quota-

This
CYLINDER HEAD
Cast in a Semi-Permanent Mold



PROVES THE 6 ADVANTAGES of PERMITE CASTINGS

1. WEIGHT . . . only two-fifths as heavy as cast iron.
2. STRENGTH . . . stronger than gray iron.
3. SOUNDNESS . . . sound throughout, without internal defects.
4. SMOOTHNESS . . . requires little polish or finish.
5. ACCURACY . . . uniformly close dimensional tolerances.
6. MACHINABILITY . . . easier and faster than cast iron to machine and fabricate.

Pig aluminum costs more than pig iron. But the above advantages reduce shipping costs, eliminate costly rejections, and cut the FINISHED COST of Permite Aluminum Alloy Castings to approximately that of cast iron. We invite you to send us your blueprints for recommendations and quotations.

ALUMINUM INDUSTRIES, INC., Cincinnati, Ohio

PERMITE Aluminum Alloy CASTINGS
Permanent Mold ★ Semi-Permanent Mold

tions are firmly held and are unchanged. Shipments are largely confined to blast furnace material and some cast scrap.

Chicago—With most mills covered on scrap requirements for most of this quarter, buying is quiet. Prices are firm, however, and in covering contracts sellers are unable to buy heavy melting steel in any volume at less than $12.50, with the top of the consumers' market on this grade nominally continuing $12.75. Scrap continues to enter this district rather freely, but there are no distress accumulations.

Boston—Domestic shipments of scrap are light, cast grades being the most active with No. 1 machinery firm at $9 to $10 delivered, New England, depending on consuming point. Some business in turnings for Pittsburgh has been done at $3.65, shipping point. Heavy melting steel is dull, especially No. 1.

New York—Scrap demand has subsided, both for export and domestic shipment. Some material is going to Italy. Domestic shipments are light. Prices are holding on most grades with cast and shafting showing strength.

Philadelphia—Scrap trading here is quiet, with prices steady. Consumers are not offering to buy in quantities nor do sellers show disposition to offer concessions. Increasing strength in pig iron prices, however, should result soon in further advances in cast scrap. The last increases in the principal grades, No. 1 cupola and No. 1 cast, came about a week or 10 days ago. Shipments of steel scrap for Claymont, Coatesville, and one or two other consuming points, are still being held up.

Buffalo — Small lots of scrap are moving to local steelworks at their bid of $12 for No. 1 heavy melting steel but large tonnages are not involved. Tonnage buying is regarded as a certainty within a fortnight with principal dealers holding out for $13.

Youngstown, O.—New purchases of iron and steel scrap in this district are at a minimum, although shipments continue to go forward fairly steadily on orders. Holders of stocks of old materials are slow to sell and dealers and brokers find it difficult either to buy or sell. Quotations are unchanged.

Detroit—A generally weak market situation is most evident in blast furnace grades, especially the lighter classifications. One reason is the apparent shift of a Cleveland furnace from a scrap mixture to practically 100 per cent iron ore. Open-hearth grades also are a little easier. Also contributing to the weakness is a sympathetic reaction to other districts, a noteworthy increase in offerings by automobile manufacturers and the sale of some dealer accumulations.

Cincinnati—The iron and steel scrap market is dull and a trifle softer. Mills continue pressure on prices and are making no tonnage commitments at current quotations. Foundry grades are relatively more active at previously established prices.

St. Louis—Iron and steel scrap continues steady to firm, but with steel mills and foundries unwilling to meet dealers' terms, trading is virtually at a standstill. Shipments on contracts are in fairly large volume and apparently material is being melted currently.

Birmingham, Ala.—Though market is not considered active prices remain firm and larger consumers of heavy melting steel are buying in small tonnages more frequently.

Seattle—Exporters expect Japan to show renewed interest in steel scrap and in the meantime are accumulating what supplies are available.

Toronto, Ont.—General business in iron and steel scrap is steady with sales gradually moving upward. Shipments of heavy melting steel and other steel grades to the Hamilton district are increasing. Burlington Steel Co., Hamilton, Ont., is using good tonnages in its new electric furnace.

Warehouse

Warehouse Prices, Page 66

Pittsburgh—Larger steel jobbers in this district report October bookings comparable with September, but some of the smaller jobbers have experienced a decline in bookings over the past two weeks. No change has been made in prices.

Cleveland—Warehouse interests have been experiencing an exceptionally good miscellaneous demand this fall, and in the last few days the number of orders and tonnage have continued to increase moderately.

Chicago — Sales have improved moderately, and indications are October will be the most active month of the year, though improvement over September, one of the previous best months, will be small.

Boston — Warehouse sales with most jobbers are brisk, with demand well spread and prices firm. Distributors of specialty materials and tool steel are doing a good volume.

Philadelphia — Galvanized sheets have been advanced $2 a ton to 4.40c. Prices otherwise are unchanged, with volume showing improvement over the last month.

Cincinnati—Jobber trade is well sustained above the September level, demand being broadly industrial. Average tonnage of purchases is slow to expand. Quotations are unchanged.

St. Louis—Volume on a daily average so far in October is running ahead of September and is well above October, 1934. Outlet through the building industry continues broad, and purchasing by the general manufacturing trade shows better than the seasonal pickup.

Seattle—Volume is holding to the level of a month ago, business being reasonably active and the general situation more satisfactory, due to the maintenance of price schedules.

WICKWIRE SPENCER perforated metals

A WIDE VARIETY TO SELECT FROM

The variety of patterns obtainable in Wickwire Spencer Decorative Perforated Metals is unusual and most helpful to the manufacturer of products using them. An ample stock is always on hand to insure prompt service. Send for your copy of the new folder "Decorative Perforated Metals". See some of the newest Wissco designs that are available.

Send for this New Folder.

WICKWIRE SPENCER STEEL COMPANY, 39 East 42nd St., New York City

Buffalo Worcester Chicago San Francisco

Semifinished

Semifinished Prices, Page 63

Some discussion is noted regarding an advance in price of sheet bars and slabs for the first quarter. At present, sheet bars and slabs are $28, base, Pittsburgh. Some adjustment also may be considered in the price of forging quality billets.

Ferroalloys

Ferroalloy Prices, Page 64

New York—Ferromanganese is unchanged at $85, duty paid, Atlantic and Gulf ports, with shipments steady, reflecting the situation in steel output. General expectation is that the movement of ferromanganese in this quarter will be the best this year. Domestic spiegeleisen, 19 to 21 per cent, is unchanged at $26, Palmerton, Pa., on lots up to 50 tons, and $24 on 50 tons and over.

Fluorspar

Pittsburgh—Several sales in this district have been made at $15.50 per net ton for carload lots of washed gravel fluorspar, representing the advanced market of $1.

Metallurgical Coke

Coke Prices, Page 63

Steadier prices in beehive and by-product coke for both metallurgical and domestic use are reported, in view of increasing labor costs plus heavier demand through approach of winter. For metallurgical purposes, Connellsville, Pa., beehive coke is selling at $3.50 to $3.75 per ton for the standard furnace grade at $4.35 to $4.50 for common foundry. The market on premium foundry coke is active and prices are ranging nearer the maximum of the $5.50 to $5.75 per ton.

Nonferrous Metals

Nonferrous Metal Prices, Page 64

New York—Price steadiness predominated in nonferrous metal markets last week, despite the strengthening in tin and decline in antimony.

Copper—Limited supplies of resale electrolytic copper at 9.00c and 9.12½c, Connecticut, were well absorbed and by the end of the week little if any metal was available under the firm producers' market of 9.25c. Although new demand was quiet, shipments to consumers maintained an active pace. A firmer price tone developed in the foreign market on the calmer views taken by diplomats regarding the Italo-Ethiopian dispute. Export copper closed around 8.90c, c.i.f. European ports.

Lead—Steadiness of lead prices at 4.35c, East St. Louis, was supported by moderate to fair sales and materially improved statistical position of the industry. Refined lead stocks were reported cut 2851 tons during September.

Tin—London tin prices fluctuated widely due to emergency shipments of Dutch tin to that city to relieve the tight situation in spot supplies and the action of the International Tin committee in lifting export quotas for the fourth quarter 10 points to 80 per cent of standard tonnages.

Steel in Europe

Foreign Steel Prices, Page 66

London — (*By Cable*) — Pig iron demand continues strong in Great Britain with foundries in the Midlands contracted well into next year. Producers of semifinished steel find it difficult to keep up with demand, and structurals, rails and plates are active. The sheet market shows marked improvement and prices have been advanced 5s. Galvanized sheets also are in better demand, with India an active market. Tin plate is strong.

Opportunities For Steel

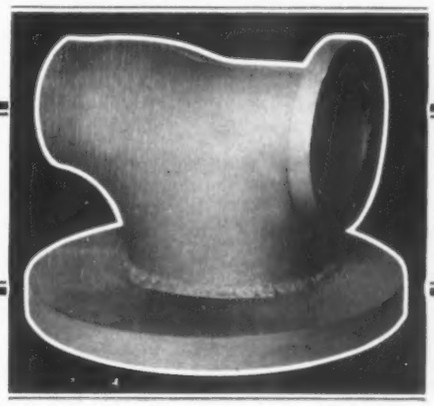
(*Continued from Page 20*)

the upper floors of steel's department store and less from its bargain basement.

In urban transportation, important advances are in the making. New street cars of light weight, almost noiseless construction are making transportation history. But before many years have passed, the pressure for something better than surface transport will necessitate subways, elevated lines, or private right-of-ways in cities of 750,000 or more population.

This need for improved facilities for transportation will be a big factor in the redesign of American cities. Within a circle of one mile radius from the center of any large city will be found narrow, impossible streets, antiquated buildings unsuited to any profitable present use, and frequent areas where old struc-

50% LESS COST



50% LESS WEIGHT

THIS is the striking result of composite design as affected by Parish engineering service on a pressure fitting of cast steel that constantly failed under high pressures in service.

Produced of a stamped-and-welded design, this fitting not only split the cost and weight of its former style but successfully tested at 100 lbs. air pressure . . . Similar savings and betterments are likewise possible on *your* manufactured parts. Your blue-prints and specifications will permit this study.

PARISH PRESSED STEEL CO.

Specialists in difficult stamping design

Robeson & Weiser Sts. READING, PA.

Pacific Coast Rep.: F. Somers Peterson Co., 57 California St., San Francisco, Calif.

tures have been demolished to reduce taxes.

Every downtown section is fringed or honeycombed with decadent sections, where buildings once occupied as residences are being utilized as temporary shops or are falling into ruin. In some cities the outlying, better residential sections have continued to grow, even during the depression, indicating a constant movement from the center to the fringe.

Old Plants Must Go

Still another aspect of the situation is the presence in downtown areas af extensive industrial plants. Many of these are idle, some are entirely unsuited to any current profitable use, and with few exceptions the maintenance of the property as an active operating unit is a heavy burden. At the first opportunity, many of these unsightly landmarks will be razed and new plants to replace them will be erected in better locations.

The foregoing indicates the need of a very extensive overhauling of American cities. It is typical of what will be done all along the line to adjust the physical facilities of the country to present day requirements. No one can deny the fact that steel will enter into the rebuilding to a far greater extent than it participated in the original structures. Whether for roads, office buildings, subways, elevated structures, residences, automobiles, buses, street cars, passenger or freight railroad cars, or plain industrial buildings, steel will be used more liberally in the second growth development of the future than it was in the virgin growth development of the past.

One reason for this is that progress in the technical development of steel has been phenomenal, even during the darkest days of the depression. Today we have numerous new steels, adaptable to every conceivable purpose. Engineers are favored with a greater variety of steels than have been available at any previous time. In fact, we must conclude that progress in the metallurgy and production of steel has far outdistanced progress in the applications of the material to profitable use. In other words, a definite challenge confronts steel merchandising to match the achievements of steel's laboratories.

Merchandising is a loosely used term, but in its broader sense it involves not only the functions of market analysis and selling, but also many allied activities which bear upon the effective capitalization of the inherent potentialities of a good product.

The opportunities for steel are almost unlimited, and good merchandising unquestionably will unlock the door to them. But before intelligent merchandising can be put to work effectively, certain obstacles must be hurdled. Every branch of the steel industry is confronted by problems—some of them inherent to the depression—which must be solved before the potentialities of future opportunities can be realized.

At this point it is fair to say that the steel construction industry is cursed with more than its rightful share of difficult questions. More than any other branch of the steel industry, it has felt the disastrous effect of the present administration's antagonism against industry. It has been plagued by a complicated alliance between professional labor arrogance and government bureaucracy. It bears the constant disturbance of an intricate and difficult freight rate situation. It struggles intermittently with a complicated mill-fabricator relationship, which is replete with inconsistencies and never-ending controversies. It is engaged in a lively debate with contractors as to jurisdictional rights. And in addition to these and other problems peculiar to its own business, it confronts the usual grist of ethical questions which are common to all industries.

Faced by such an imposing array of problems, the companies embraced in the steel construction industry must put forth the best effort of which they are capable—individually and co-operatively—to seek their solution.

For reasons which are familiar to you, the opportunities for correcting industry ills by individual action are somewhat restricted. No one company, or even the two largest ones, can exert enough influence on group problems to obtain beneficial results without the help of a large number of the other units in the field. The main job undoubtedly calls for group action.

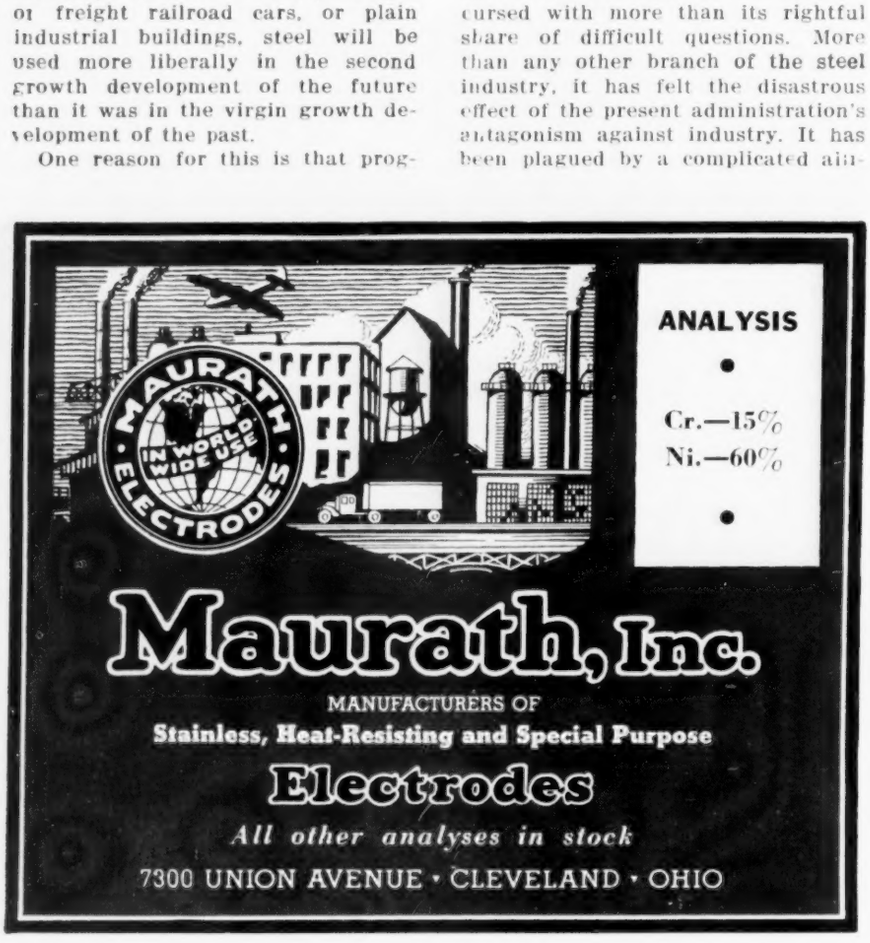
But before going into the subject of co-operative effort, I would call your attention to two ways in which individual companies, acting independently, can do much good for themselves and for their industry.

Provide Better Service

First is to constantly improve the quality of work and service. The executives of each company may well ask themselves whether they are better prepared in this respect today than they were at the beginning of the depression. Have you eliminated the inefficiency which crept into your organization during the easy predepression period? Are you taking full advantage of the new materials, equipment and methods which have been developed in recent years? Are you striving earnestly to give your customers greater values for their money than you were able to give in the past? Are you doing your share to advance the art of steel construction?

Unless you can answer affirmatively to most of these questions, you have failed to learn the big lesson of this depression. It is a serious mistake for any company to sit tight on inefficient methods and to expect co-operative group action to hold a protective umbrella over its shortcomings. The initiative for progress should originate with the individuals.

There is one other job in which individual company action can be most effective. Members of the steel construction industry know probably better than individuals in many other industries the harmful effects



of the attitude of the present government administration toward business. They know that the present tendency toward government ownership, political bureaucracy, collectivism, hasty and ill-advised reform, and many other destructive activities must be curbed before any industry can reap the full benefits of its opportunities.

The ability of industrial organizations to change this condition by means of protests through the usual channels is somewhat restricted. Mass protests from business interests have been discounted by the public to a large extent, although it is likely that such protests may carry more weight as the public mind swings back to a more normal attitude.

In the meantime, the executives of steel construction companies can do a great deal to help senators and congressmen to be better informed of industry's attitude toward alarming government tendencies. The plan is not new; it has been tried on a limited scale and has proved beneficial.

Invite your senators and representatives, either singly or in groups, to visit your plant. If possible arrange the visit so that they can spend several hours with you. When they arrive, introduce your associates to them. In a brief way explain what your company makes, to whom and where it sells its product, the number of men you employ and what they mean to the community in terms of buying power to local stores, the amount of taxes to pay to local and federal governments, what your business means to the railroads serving your community, what it means to banks, schools, public institutitons, community welfare work, etc. In short, explain everything that will impress your Washington representatives with the extent of your participation in the advancement of the welfare of the community.

Explain Industry's Problems

Next explain how the tendencies at Washington are making it more difficult for you to operate. Trace the effect of government ownership, interference with business, bureaucracy, foolish experiments, etc. Then take your guests on a tour of inspection of your plant, explaining interesting points as you go along. At the end of the visit, offer to furnish any information at any time which will help the congressmen to understand industry better, and as the final clincher, ask them point blank to consider industry's problems more sympathetically when they vote in the next session of congress.

If you plan this visitation carefully and carry through effectively, you will be surprised at the cordial attitude of your visitors. In all but a few stubborn cases, you will implant ideas which will help to insure industry a squarer deal in the next congress.

But in spite of all that can be accomplished by intelligent and aggressive company action, the great field of opportunity for solving industry's problems lies in effective organization for co-operative effort. The steel construction industry, as it exists today, owes a great debt of gratitude to many executives in this room and to the late Lee Miller and Charles F. Abbott for their foresight and ability in estabiishing the American Institute of Steel Construction on sound lines, long before it was to meet the test of an unforeseen, major industrial crisis.

Everyone knows the increased stature acquired by the steel constructtion industry because of the efforts of the institute. Without the habit of co-operation which had been formed in the early days of the institute, it is extremely doubtful whether the industry could have retained its identity during the last two years. Had steel constructors in 1933 been forced to hastily throw together an organization under NIRA, without the aid of the smooth running machinery of its long tested institute, their difficulties in dealing with Washington would have been increased many fold.

Now that NIRA has been abandoned and the frustrated effort of the industry to win government acceptance of a workable code is a matter of history, we can turn our attention to problems of current moment.

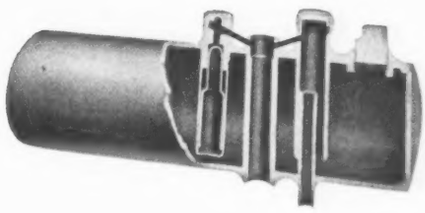
You have adopted a plan, the details of which I will not attempt to discuss, which is intended to promote fair trade practices. Through its machinery, you are attempting to accomplish some of the objectives which were sought a decade ago, when the institute negotiated a fair trade practice agreement with the federal trade commission.

Police Power Not Answer

If I remember correctly, the failure of that effort was ascribed by many members to the fact that the pact worked up under federal trade commission supervision lacked the teeth of enforcement. It was said that no plan would work unless it had the police power of government behind it.

As you well know, the attempt to codify industry under NIRA, where the power of enforcement was available, fell far short of success. At the time NIRA was abandoned, only a few of the hundreds of existing codes were running smoothly. Most of the others had broken down. Even in those which were functioning at the end, there were numerous evidences of an increasing number of infractions and evasions. In my opinion, all

CROSBY STAMPINGS



Forty years of concentration on producing Metal Stampings, exclusively, has given us a wide experience which is available to you.

If you have never used Crosby Service, let us figure on your next stamping job.

THE CROSBY COMPANY
BUFFALO, N. Y.

Branch Offices

New York Chicago Philadelphia Detroit Cleveland

but a very few of the codes would have become ineffective in another six months, assuming that NIRA had been extended.

Thus it would seem that government police power is not the answer to effective administration of fair practice agreements. For that reason, I believe that industrial groups should go slow in accepting the government's recent invitation to resume participation in voluntary trade pacts.

It is the contention of many well informed industrialists that the job of keeping one's industry's house in order belongs to the industry itself. I subscribe to this belief, largely because it seems so evident that the success or failure of the agreement lies with the character of its individual signers, and not with government influence or police powers. The job is primarily one of education, of debating questions of ethics, and of gradually raising the standards of business methods.

Slow Progress Natural

In saying this I know full well the difficulty which can be caused by a few determined chiselers. But who can say, in the light of past experience, that the police power of government is more effective than the power of good example set by an increasing majority of the industry?

The institute does well, in my opinion, to attempt to solve its problems by its own devices, and without the help of the government. The recently adopted plan may not work to the complete satisfaction of everyone concerned. If it did it would be a miracle. But you are going at the problem in the right way, even though it may be a hard and difficult way. Human nature resists change, and since it is the principal commodity you will deal with in administering your plan, you may expect slow, encouraging progress rather than immediate, spectacular success.

The steel construction industry is peculiar in that it has a sharp line of demarcation between the few very large companies and several hundred companies of moderate and small size. The problems arising from this distinction are further complicated by certain relations of the larger companies with mill interests.

At the risk of touching upon an extremely delicate subject, I would like to submit two important premises which sometimes are overlooked. The first is that it is vital to the interest of the large, mill-integrated companies that they use tactics which will help to perpetuate the existence of a large number of small competitors.

This is true not only of the steel construction industry but of all industry. Once this country permits conditions which tend to wipe out the small units and to increase the power of a few large companies, one of two things will happen. The government will be compelled to regulate business, or economic and political influences will force upon us some form of socialism or collectivism, which will be far more terrifying than the new deal.

Today the existence of small business is the only thing which prevents a more militant action against big business. Moreover, the economic justification of the presence of small units, especially in the steel construction field, cannot be denied.

The second premise is that in any co-operative effort in which large and small units participate with equal freedom, the large companies give up more proportionately in return for what they receive than do the small members. In watching trade associations for 20 years, I have felt that the heads of small companies often are unduly suspicious of the motives of their large competitors. At times such suspicion is well founded, but in the main it is more likely to be exaggerated than under-rated.

Mutual understanding and tolerance by both interests is essential, and thus far no agency has been developed which promotes these qualities as effectively as a well administered trade association.

Market Research Essential

No discourse on opportunities for steel would be complete without a reference to the prime importance of research and market development. Earlier in this talk, emphasis was placed upon the fact that much of steel's progress in the future will lie in new or radically changed markets.

It is gratifying to note that this institute realizes that markets do not remain static. The attention given to the investigation of steel dams, improved fireproofing, bridge design and construction, and the use of welding indicates a desire to enhance the capacity of steel to serve mankind more efficiently.

This is a most important line of activity. Everytime an improvement in material, method or design permits steel to enter new fields of service or to do a better job in old markets, the industry benefits not only from the attendant increase in the volume of its business but also from the fact that the pressure on internal problems of competition is somewhat relieved.

Continue to work assiduously to improve steel construction, to extend it into new markets and more appropriately into old ones, and to understand each other's competitive problems more thoroughly! If you do this, you will share liberally in the opportunities which await steel in the future.

THE COMING

MOTOR BOOM

AND SUBSEQUENT SLUMP

By L. L. B. ANGAS

In this complete 16-page Brookmire Bulletin Major Angas surveys the probabilities for growth in the Motor Industry and projects his forecast for the next three years. The analysis is replete with graphs and statistics.

Copies of this analysis have been reserved for distribution at $1 each. Send for your copy today.

Write today for Bulletin M-57, enclosing one dollar.

BROOKMIRE

Corporation *Founded* 1904

Investment Counselors and Administrative Economists

551 Fifth Avenue, New York

Equipment

Chicago—Activity in most equipment markets is well maintained. Machine tool sales generally are regarded as satisfactory, though somewhat less active than 60 days ago. Most tool purchases are small individually, though several moderate lots are outstanding. International Harvester Co. is expected to place a number of tools for its East Moline, Ill., plant, while the Bucyrus-Erie Co. is in the market for about a half dozen items at Milwaukee. The Chicago sanitary district and the

Milwaukee road have yet to close on lists of similar size. Small tool buying remains steady and in fairly heavy volume.

New York—With buying active, inquiry heavy, machine tool builders are in many instances pushed on delivery and some shops producing heavier types of equipment are unable to make delivery of new orders before early next year. Dealers in this district are practically unanimous in agreeing purchasing holds without a decrease. Demand is featured by orders for the heavier tools which until several weeks ago lagged behind the remainder of the list. American Car & Foundry Co. has bought considerable heavy equipment. One interest at least has advanced prices on brakes 5 per cent.

Boston—Machine tool buying continues unabated, most shops operating at capacity, and a substantial volume of active business is being figured. Demand is widely spread with automotive accessory plants notably active customers. As to delivery, the best builders of smaller machines or grinding equipment units promise is six weeks while some of the heavier tool shops require 12 weeks. Brown & Sharpe Mfg. Co., Providence, R. I., is low on five milling machines for the Newport, R. I., naval station. Arsenals at Watertown and Springfield, Mass., have been recent purchasers of cams, chucks, small tools and ball bearings.

Pittsburgh—The steel mill equipment trade continues to hear reports of a survey which Jones & Laughlin Steel Corp. here is making on the possibility of installing a hot-strip mill, possibly a 36-inch unit. As yet no formal inquiry has been made. A district equipment builder closed late last week on an important three-high mill for export to Australia. Steel mill roll business continues to hold at a steady pace. Among the most promising pieces of mill equipment business now nearing the contract stage is the award of the Carnegie-Illinois Steel Corp.'s Homestead, Pa., plate mill. Bids last week were received from 36 concerns on the foundation work.

Cleveland—Equipment purchases of automobile plants are reflected in a steady market here, with deliveries on some tools considerably extended. Demand for used tools is lively and some suppliers are pressed to meet current needs of equipment users.

Seattle—Logging, road and mining equipment are still in good demand although the inquiry from Alaskan sources is lagging with the end of the season. Spokane, Wash., will receive bids Oct. 31 for three automatic, propeller-type, hydraulic turbines and auxiliaries. Seattle opened bids Oct. 24 for radial drill press, lathe, grinder and shaper.

Construction and Enterprise

Michigan

BUCHANAN, MICH. — Larson Steel Products Corp. has been incorporated with capital stock of $125,000 to manufacture steel products, by M. K. Hicks, Grand Rapids, Mich.

DETROIT—Linderme Machine & Tool Co. is considering the erection of a small addition to its plant.

DETROIT—Saylor Electric Products Corp. has been incorported to deal in electric machinery, by Joseph M. Sharkey, 1014 Lynn street.

DETROIT—White Co., 31 Thompson avenue, Long Island City, N. Y., is considering the purchase of a building here which it will alter and equip for manufacturing purposes. Cost over $40,000.

GRAND RAPIDS, MICH. — Kent Refining Co. plans construction of an addition to its oil refinery, costing approximately $75,000.

GRAND RAPIDS, MICH. — Leonard Refrigerator Co., a branch of Kelvinator Corp., Detroit, has under way an expansion program costing $250,000. Although most of this expenditure will be used for installation of new equipment, considerable remodeling and some additions to buildings are also planned. F. D. Brebner is plant manager.

HILLSDALE, MICH.—Oak Screw Products Co. has been incorporated with $50,000 capital, to manufacture screw machine products, by Victor E. Decker, Hillsdale, Mich.

HILLSDALE, MICH. — Hillsdale chamber of commerce has completed arrangements for the removal to Hillsdale of the Burr Oak Screw Products Co., to be housed in an unused 2-story tannery building.

HOLLAND, MICH. — Charles Karr Co., manufacturer of mattress springs, is planning to make extensions to its plant, costing about $10,000.

HOLLAND, MICH. — Hart & Cooley Mfg. Co., maker of grills and registers, is building an addition to its plant to take care of a new line of air-conditioning grills.

MARQUETTE, MICH. — Lake Shore Engine Works plans rebuilding pattern shed, damaged by fire recently.

MUSKEGON, MICH. — Harry Lewis, city engineer, is taking steps to prepare plans for Muskegon's two WPA projects. Plans for the $650,000 filtration plant and the $500,000 sewage disposal plant must be submitted to WPA by Nov. 15.

MUSKEGON, MICH. — Muskegon Tanning Co., a newly-organized concern, headed by Bernard C. Nelson, vice president of the Nelson Tanning & Dyeing Co., Milwaukee, has purchased the former Loescher tannery here. Approximately $40,000 will be spent for remodeling and equipping the property.

MUSKEGON, MICH. — Prospects of closing negotiations soon with two industries were reported by the Muskegon chamber of commerce. A nationally-known manufacturing concern is considering establishment of a branch machine shop here, and an eastern concern has taken an option on another Muskegon plant and proposes to move its operations here. Names of the concerns were not disclosed.

WHITE CLOUD, MICH.—City will double the output of the municipal light and power plant by constructing a new $47,000 plant unit.

Ohio

CAREY, O. — Lovell Machine Shop is being moved here, taking over a building on West North street.

CELINA, O.—Brandt Furniture Co. is planning to rebuild the 2-story fur-

WELDING WIRE

Highest Quality and Service Guaranteed

WIRE

SHAPES

Square . Keystone . Flat . Round
Half Round . Special

STOCK

High Carbon . Low Carbon . Alloy
Tempered and Untempered

Also Screen Wire Cloth

THE SENECA WIRE & MFG. COMPANY

Established 1905

FOSTORIA, OHIO

IRON STEEL WIRE SENECA QUALITY

Warehouses and Representatives in practically all principal cities.

niture manufacturing plant recently damaged by fire.

CLEVELAND — Ferbert-Schorndorfer Co., 12815 Elmwood avenue, is erecting a $50,000 addition to its paint plant.

CLEVELAND — Skybryte Co., 1919 East Nineteenth street, maker of rust preventives, is moving to a larger plant at 3125 Perkins avenue.

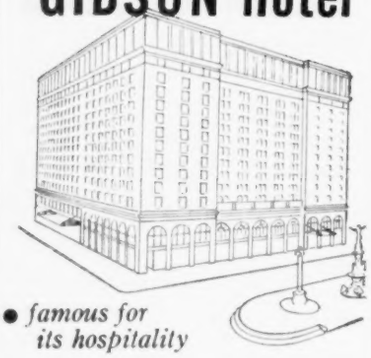
ELYRIA, O. — Timms Spring Co. has started construction of a new 1-story structure, 60 x 120 feet, costing approximately $15,000. The new addition will increase floor space to approximately 20,000 feet and will permit expansion of the company's oil tempering equipment.

NORWALK, O. — City council is planning to purchase a $45,000 turbine of about 2500-kilowatt capacity for installation in the municipal light plant.

FAMOUS LANDMARKS

San Francisco has the Golden Gate Bridge

Cincinnati has the GIBSON Hotel



• *famous for its hospitality*

Experienced travelers stop at the Gibson. Here is the completeness of service and facilities they want. And a remembering smile. 1,000 rooms—all with bath. Delightful restaurants and bars.

Rates—from $2.50 single; $4 double

F. W. PALLANT, General Manager

Illinois

COLLINSVILLE, ILL.—St. Louis Smelting & Refining Co. plans to remove its plant here, which has been closed for more than a year, to Barranceueras, Argentina, South America.

EAST MOLINE, ILL. — Deere & Co., manufacturer of agricultural machinery and equipment, has awarded contracts for construction of a 1-story warehouse and plant addition, 180 x 280 feet.

MAYWOOD, ILL.—Village is considering waterworks softening plant and relief sewer system, costing $1,187,000. PWA funds have been approved. Consoer, Townsend, Quiblan, 205 West Wacker drive, Chicago, engineer.

Indiana

INDIANAPOLIS — Allied Mfg. Co. Inc., 2829 Northwestern avenue, has been formed to manufacture metal product devices, by Harley H. Horton, also named resident agent, Keith Kiepfer and H. J. Denk.

INDIANAPOLIS—Max Robbins Metal Co. Inc., 2316 Bloyd avenue, has been formed to manufacture, mine, smelt and refine metals, by Max Robbins, also named resident agent, F. J. Menninger and Bessie Robbins.

Massachusetts

METHUEN, MASS.—Joseph Bentley Chair Mfg. Co., 22 Pelham avenue, is planning to rebuild its 2-story factory. Cost will exceed $40,000.

TOPSFIELD, MASS.—Town, A. B. Carter clerk, Town Hall, plans waterworks system, costing $65,000. PWA has approved $29,250 grant. Henry Goodnough Inc., 14 Beacon street, Boston, engineer.

Rhode Island

PROVIDENCE, R. I.—White Co., 31 Thompson avenue, Long Island City, N. Y., is planning to purchase a building here to be altered and equipped for a branch plant. Cost will exceed $40,000.

New York

BROOKLYN, N. Y. — Porcelain Metals Inc., 58 Sedgewick street, plans alterations to its factory at Dutch Kills, Borden and Review avenues, Long Island City, N. Y. Estimated cost, including equipment, $28,000.

BROOKLYN, N. Y. — Demuth Glass Works, Eleventh street and Wythe avenue, plans to make alterations to its glass factory. Work will be done by separate contracts. G. J. Smith, 32 Miriam street, Valley Stream, L. I., architect.

BUFFALO — Wiley Displays Inc. has been organized by Roy R. Wiley, to manufacture metal and other display signs. The company has leased quarters at Elmwood and Hertel avenues.

BUFFALO — Worthington Pump & Machinery Corp., Harrison, N. J., is erecting a new machine shop at its Buffalo plant at an estimated cost of $200,000. Further additions are planned when this unit is completed.

DUNKIRK, N. Y.—American Fork & Hoe Co., A. Milligan general manager, is planning to install a new 18-inch roiling mill, rehabilitate and alter the finishing department and install machinery and equipment. Estimated cost will exceed $35,000.

ELMIRA, N. Y.—Willys-Morrow plant here has been sold by David R. Wilson, receiver for Willys-Overland, for $300,000 to Elmira Industries Inc.

FRANKFORT, N. Y. — Parmelee Mfg. Corp. has been incorporated with $25,000 capital to manufacture machinery by William C. Murray and Clement R. Newkirk, Utica, N. Y., and Edward K. Parmelee, Union Block, Frankfort, N. Y. Papers were filed by Rudd, Griffin & Penberthy, Mayro building, Utica, N. Y.

NEW YORK — Favorite Foundry Co. Inc., Manhattan, has been incorporated to deal in iron and cast iron parts. Papers filed by H. Herman Haimowitz, 233 Broadway, New York City.

NIAGARA FALLS, N. Y. — Acheson Graphite Co., Buffalo avenue, will soon take bids for extensive alterations to its factory buildings Nos. 8 and 17.

YONKERS, N. Y.—Empire Distilling Corp., 347 Madison avenue, New York, plans addition to and extension of its plant on the Hudson river. About $50,000 will be expended.

New Jersey

DEEPWATER, N. J. — E. I. du Pont de Nemours Inc., Wilmington, Del., has completed plans for an addition to its color manufacturing plant here.

Pennsylvania

ELKLAND, PA. — Elkland Leather Co. will build an addition to its hide and leather factory. Project includes installation of 150 new vats and other equipment.

ERIE, PA.—Louis Marx Co. Inc., 200 Fifth avenue, New York, toy manufacturer, has purchased the plant of the Erie Stove & Mfg. Co. here, which it probably will remodel and equip for manufacturing purposes.

PALMERTON, PA.—New Jersey Zinc Co. has awarded contracts for construction of new furnace buildings and other improvements to its local plant. Estimated cost is $50,000.

Alabama

COURTLAND, ALA. — Town, R. E. Coburn mayor, receives bids Oct. 31 for constructing complete waterworks system, consisting of 50 gallon-per-minute deep well pump, booster pump, pump and apparatus house, water treating plant, 50,000-gallon tank and tower, and 21,000 feet of cast iron pipe.

MOBILE, ALA.—Southern Kraft Corp., 220 East Forty-second street, New York, will erect an addition to its plant here and will install additional paper-making machines. Maj. J. H. Friend, vice president in charge of operations.

SHEFFIELD, ALA. — Robert A. Boothe Equipment Co. is interested in purchasing a 50,000-gallon tank and tower, 60 to 80 feet high, and a 250-horsepower Scotch marine boiler.

Delaware

EDGE MOOR, DEL. — Ludlow Association will receive bids shortly on the construction of a jute mill, 1-story high, 400 x 400 feet.

District of Columbia

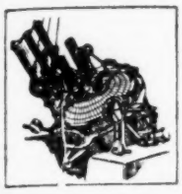
WASHINGTON — Bureau of sup-

(*Please turn to page* 86)

WILLIAM C. BUELL, JR.
P. O. Box 6093 ENGINEER Phone HE. 1049
CLEVELAND, OHIO.
THE OPEN HEARTH
Increased Ingot Production and Lower Costs in Existing Plants

THOMSON-GIBB ELECTRIC WELDING CO.
PUBLISHED MONTHLY *flashes* LYNN, MASS.
NEWS, IDEAS AND INFORMATION ABOUT PRODUCTION WELDING OF INTEREST TO EVERY MANUFACTURER WHO WANTS BETTER, FASTER PRODUCTION AT LOWER COST
DO YOU GET YOUR COPY EACH MONTH?

Simonds Cut Gears
SPUR—BEVEL—MITRE & WORM—RACK CUT TEETH—SPECIAL MACHINERY . .
Treated gears—cut and finished by Simonds—last longer, eliminate costly shut downs and work smoother and more efficiently.
Made in all sizes for any service and TREATED to meet your requirements.
Also—
Ramsey Silent Chain Drives : Gates Vulco Rope Drives : All Steel Silent Pinions : Bakelite Silent Pinions
The SIMONDS MANUFACTURING Co.
25th STREET PITTSBURGH, PA.


Moore Rapid LECTROMELT Furnaces
Standard Sizes 25 lbs. to 100 Tons Capacity
Most Rapid and efficient for making
Tool Steels, Alloy Steels, Forging Steels Steel Castings, Malleable Iron, Grey Iron, Carbide, Ferro-Alloys etc.
PITTSBURGH LECTROMELT FURNACE CORP.
P.O. BOX 1457, FOOT OF 2ND ST. PITTSBURGH, PA. U.S.A.

MEDART
Bar and Tube MACHINERY
For turning, straightening and polishing round bars and tubes.
Complete data on request
THE MEDART COMPANY
3500 DEKALB ST. ST. LOUIS, MISSOURI

For Low Cost Industrial Heating—
"We Guarantee Results"
F. & D. Producer Gas Systems
Using Bituminous and Anthracite Coals Raw and Scrubbed Gas for Displacing Oil. City and Natural Gas, Coal and Coke in Furnaces of all descriptions.
Flinn & Dreffein Co., 308 W. Washington St., Chicago, Ill.

SC&H Furnaces are made for annealing, case hardening, carburizing, forging, cyaniding, lead hardening & oil tempering.
STRONG CARLISLE & HAMMOND
1400 W. 3rd St., Cleveland, O.
SC&H Furnaces are built in all sizes of Oven, Pot, Continuous, and Special Types for Electric, Oil or Gas application.

BUFF-ALOY
A High Abrasion Resisting Wire Cloth recently developed. Also Wire Cloth and Wire Products for all Industrial Purposes.
Send for Catalog No. 10-H.H.
BUFFALO WIRE WORKS CO., Inc.
Formerly Scheeler's Sons—Est. 1869
437 Terrace Buffalo, N.Y.

THOMAS
SPACING MACHINE COMPANY
PITTSBURGH
PUNCHING & SHEARING MACHINERY

244 Pages, 6" x 9"
116 Illustrations
9 Tables
The Manufacture of Steel Sheets
By Edward S. Lawrence
Describes sequence of operations in sheetmaking from manufacture of steel to finished sheet, with especial reference to production of high grade sheets for automobile bodies; influence of various methods upon quality of product and causes and prevention of defects are given attention; description follows current practice and is devoid of unnecessary technicalities.
THE PENTON PUBLISHING COMPANY
Book Department
1213-35 W. 3rd. St. Cleveland, O.
Price Postpaid $6.15 in U. S. and Canada 30s. 6d. in other countries
131-S

(Concluded from page 84)

plies and accounts, navy department, will open bids Nov. 1, schedule 6231, one motor-driven surface vertical grinder, delivered Mare Island, Calif.; schedule 6318, one motor-driven sheet metal forming machine, delivered Norfolk, Va.; schedule 6331, one motor-driven speed lathe, delivered Portsmouth, N. H.; schedule 6301, one motor generator set complete with switchboard; Nov. 5, schedule 6294, one motor-driven high speed hacksaw machine; schedule 6297, one motor-driven drill press; schedule 6292, one motor-driven surface grinding machine, all delivered Mare Island, Calif.; Nov. 8, schedule 6264, steel forgings.

Kentucky

LEXINGTON, KY. — Belle of Anderson County Distilling Co. plans expending $80,000 for remodeling the Daniel Boone Lodge into a distillery.

North Carolina

CHARLOTTE, N. C. — Old Dominion Box Co., Lynchburg, Va., is establishing a plant here in a building formerly occupied by Savona Mill Co. Machinery will be installed for manufacture of all types of containers.

KERNERSVILLE, N. C. — Northrup & O'Brien, architects, are taking bids for construction of a modern new laundry building for R. D. Shore. The building will be 50 x 100 feet, with heating and power plant addition. Metal windows will be used.

Tennessee

KNOXVILLE, TENN. — Tennessee Valley Authority opens bids Nov. 1 for mechanical and electrical equipment, drives and conveyor belting for handling aggregate and concrete in connection with storage and recovery system and central mixing plant at Pickwick Landing dam.

Virginia

EMPORIA, VA.—Town, A. J. Daughtrey mayor, will take bids Oct. 30 for construction of a 200,000-gallon steel elevated water storage tank and tower. File No. Va. 1073. Wiley & Wilson, consulting engineers, 513 American National Bank building, Richmond, Va.

NORFOLK, VA. — City, Walter H. Taylor Third, director of public works, receives bids Nov. 4 for furnishing six centrifugal sewage pumps, including motors and starting equipment and two centrifugal vacuum pumps with necessary float control. PWA project. Norman Z. Ball, principal assistant engineer.

RICHMOND, VA. — E. I. du Pont de Nemours Inc., Wilmington, Del., has started to prepare plans for additions to its rayon plant here, to cost $3,500,000.

Missouri

PILOT GROVE, MO. — City, Charles T. Babbitt mayor, will open bids Nov. 5 for $36,500 waterworks system, including installation of deep well turbine pump, 75,000-gallon tank on 125-foot tower, and deep well pump and motor.

Arkansas

GILLETTE, ARK.—G. Place, mayor, plans a waterworks system costing $55,000. PWA has approved grant of $24,750 and loan of $30,250. F. A. Pritchette, Wallace building, Little Rock, Ark., engineer.

Oklahoma

OKLAHOMA CITY, OKLA. — Wilson & Co. Inc., W. W. Martin manager, will expend $250,000 in plant improvements, including construction of new loading and unloading docks.

Wisconsin

APPLETON, WIS. — Appleton Wire Works, specializing in screens for paper and pulp industry, is planning to increase its plant capacity and modernize its present factory. W. E. Buchanan is vice president and manager.

CARROLLVILLE, WIS. — Koppers Products Co. has begun the expenditure of $25,000 for plant improvements, largely the installation of a heating plant and insulation of one of the large processing rooms.

CHILTON, WIS. — Aluminum Specialty Co., with headquarters at Manitowoc, Wis., has let contracts for a 2-story shop addition, 60 x 75 feet, at its branch plant here. Charles Krug is local manager.

MILWAUKEE—Joseph Schlitz Brewing Co. will build a new 4-story stockhouse, 100 x 150 feet, enlarge its dryer houses and make other improvements requiring considerable equipment. Investment will be about $250,000.

MILWAUKEE — Fred Miller Brewing Co. will make alterations costing $7500 to its boiler house, and build a new private garage and service building, 76 x 111 feet, costing $25,000. W. H. Kraft is general manager.

SOUTH MILWAUKEE, WIS. — Electrolite Battery Mfg. Corp., Milwaukee, has purchased the plant of the former Burnham Bros. Brick Co. here and is adding to its present equipment facilities. M. A. Weinreis is secretary and treasurer.

Kansas

PITTSBURGH, KANS.—City plans waterworks improvements, costing $350,000. Application for PWA funds has been approved. Black & Veatch, 4706 Broadway, Kansas City, Mo., engineer.

Minnesota

GLENWOOD, MINN.—City will soon take bids for construction of a municipal light and power plant, to cost about $160,000. Funds have been allotted by PWA. Burlingame & Hitchcock, Sexton building, Minneapolis, engineers.

ST. PAUL — Twin City Bedding Co., 857 Rice street, manufacturer of mattresses and other bedding products, has awarded contracts for construction of a 1-story factory addition, 39 x 60 feet.

ST. PAUL — Maj. Dwight F. Johns, district engineer, 615 Commerce building, will take bids Nov. 13 for furnishing two gas-engine operated, full-revolving, locomotive-type cranes for lock and dam Nos. 7 and 8 in the Mississippi river.

ST. PAUL — Snell Sash & Door Co., 1400 Selby avenue, has awarded contracts for construction of a 1-story factory addition, 70 x 100 feet, for the manufacture of sash and door and other millwork products. A considerable amount of new and additional woodworking machinery and equipment will be installed.

WILLMAR, MINN.—State, care of board of control, L. G. Faley chairman, State Office building, St. Paul, rejected bids taken Aug. 20 for boiler plant improvements, including installation of new water tube boiler and stoker, costing approximately $25,000. New bids are being received.

North Dakota

CROSBY, N. DAK. — City will soon take bids for construction of a municipal light and power plant, to cost about $100,000, including power plant, power plant equipment and distribution lines. T. R. Atkinson, Bismarck, N. Dak., is engineer.

Iowa

BURLINGTON, IOWA — Maj. E. E. Gesler, acting district engineer, Clock Tower building, Rock Island, Ill., will take bids Nov. 14 for furnishing and installing power, control and lighting system for lock and dam No. 18 in the Mississippi river, including lock power and control system, dam power distribution system, gas-electric standby power unit, hand-operated traveling bridge crane, etc.

FORT DODGE, IOWA — National Gypsum Co. plans improvements to its plant, including construction of a new wallboard manufacturing plant, to cost about $100,000.

Pacific Coast

LOS ANGELES — Twentieth Century-Fox Studios, Joseph M. Schenck chairman of the board, has under way a $2,500,000 studio expansion program. The new buildings will include a new blacksmith, machine, paint and plaster shops, a 6-story property building and a factory equipped for the making of properties.

PORTLAND, OREG. — Plans have been announced by Russell Miller, vice president, Pacific Fruit & Produce Co., for a $200,000 concrete warehouse, containing air-conditioned rooms, conveyor system and other modern devices. The structure will be built for the Union Pacific railway, and leased by the fruit concern.

HOQUIAM, WASH.—Plans are completed for a $100,000 high school addition, including carpenter and machine shops.

SELAH, WASH. — City engineer Gerald D. Hall is preparing plans for a sewer system and disposal plant.

VANCOUVER, WASH. — State highway department has completed plans and will soon call bids for district headquarters to cost $152,000. Four concrete buildings are involved, including repair, storage, paint, carpenter and blacksmith shops.

Dominion of Canada

BRIDGEWATER, N. S. — Annapolis Basin Pulp & Paper Co. Ltd. has plans for building a pulp mill, estimated to cost $250,000.

LINDSAY, ONT.—Castle Motor Co. Ltd. is contemplating construction of an additional factory unit for chrome plating facilities. Cost $40,000.

MONTREAL, QUE.—Dominion Glass Co., 1111 Beaver Hall Hill, has awarded contract to W. H. Cooper, 42 James street, North, Hamilton, Ont., for extensions and alterations to its plant. Estimated cost $100,000.